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CLINICAL MEDICINE

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By

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PROFESSOR OF PHARMACOLOGY AND THERAPEUTICS
IN THE SCHOOL OF MEDICINE OF TULANE UNIVERSITY

IN RECOGNITION
OF HIS PERSONAL EXCELLENCE AND HIGH
SCIENTIFIC ATTAINMENTS
AND
IN GRATEFUL REMEMBRANCE OF INNUMERABLE
ACTS OF KINDNESS

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PREFACE

Both as a teacher of Clinical Medicine and Therapeutics and as a Physician the author has been increasingly impressed for many years with the thought that there was still a field in medical literature largely untouched.

There are the great systems of medicine giving in detail all or nearly all of our present knowledge of disease and its management, and also the condensed single volume treatises on the Practice of Medicine giving the gist of what is known, but necessarily leaving much to the more complete sources and trusting much to the previous equipment of the reader. Both of these groups should be well represented in every physician's library.

Most of the literature on the Practice of Medicine is based on work in fully equipped hospitals or in the homes of the wealthy, where every advantage of modern science is available; while, as a matter of fact, the great majority of patients must be treated in homes and under conditions offering limited facilities to aid the physician in his efforts. It has been with this larger group constantly in mind that the author has taught and that this book has been written, and it is practically the lectures given by him to undergraduate and postgraduate students during recent years at Tulane University.

An effort has been made by the author to put into one volume of moderate size the latest and most generally accepted information as to the diagnosis and treatment of about one hundred of the most common diseases coming within the province of Internal Medicine. Unproven theory has been omitted almost entirely.

The author wishes to make special acknowledgement to Dr. J. T. Halsey for his assistance in this, as well as in almost every other phase of his professional career, to Dr. P. G. Cully for a critical review of the manuscript, to Mrs. E. A. Fowler for much editorial assistance and to Mr. Charles O. Scholder, without whose coöperation continued progress on the compilation of this work would at times have been impossible.

Oscar W. Bethea.

1453 State Street,
New Orleans, La.,
May, 1928

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CLINICAL MEDICINE

RESPIRATORY DISEASES

TUBERCULOSIS

General Statement. Definition.—Tuberculosis is the condition resulting from the presence in the body of tubercle bacilli.

Two general divisions are recognized. First—Tuberculous infection, in which the individual harbors the germs but, the organisms being relatively inactive, there is no evidence of disease. Second—Tuberculous disease in which the process is active and the patient gives more or less evidence of the morbid state.

It is known that a large part of the human race has the infection, while, fortunately, a comparatively small percentage are victims of the active disease. The infection may remain dormant for an indefinite time and then become active and change to tuberculous disease, or the infection may be harbored indefinitely without any destructive process resulting.

Various manifestations are recognized, such as acute, chronic, fibroid, pneumonic, and surgical. Tuberculosis is also grouped according to location, for example, pulmonary tuberculosis, tubercular peritonitis, arthritis, adenitis, and osteomyelitis. We will deal here with pulmonary tuberculosis, without differentiating the possible subdivisions.

Incidence.—There is no race, nationality, section, age, or sex that is immune, though some of these factors to a certain extant influence the chances of infection and the course of the disease.

Race. Those peoples who have not been subjected to this disease have less resistance when they do become infected. For many years it was thought that the African Negroes, living as slaves, were largely immune, and the disease was spoken of as the "White Plague." We know today that the resistance of the negro is less than that of the whites; at least the mortality is considerably higher and the disease runs a more rapid course. There are several factors that contribute to this. One is the large percentage of syphilis among the members of this race and another is the unfavorable hygienic conditions under which they live. Again, we must take into consideration the fact that they are not under the same degree of medical supervision; therefore, the diagnosis is usually later and the treatment as a whole is directed by less competent advisors. The negro patient's co-operation is also notoriously defective.

It is rather hard to explain the comparative immunity that the negro enjoyed in the Southern States previous to the abolition of slavery. It is probable that one important factor was that they were not allowed to mix indiscriminately in a way that would expose them to the disease. Some writers have claimed that the negroes, even before the Civil War, had their full percentage of tuberculosis. A most interesting article along this line came from Charleston. The writer probably failed to take into consideration the fact that the Charleston negroes before the Civil War had a very large percentage of white blood, probably more than at any other place, due to the peculiar conditions that had existed in that City. There was also a larger number of free negroes.

Nationality. Tuberculous disease is found in every civilized country and there is no very marked degree of difference in the incidence.

Section. Many conflicting reports have been published as to the relative prevalence of the disease in various sections of the country. It is highly probable that this is accounted for largely by some places being more popular as resorts for those afflicted. In any event the actual difference is relatively immaterial.

Age. Pulmonary tuberculosis is moderately rare in childhood. The most common period is during the second, third, and fourth decades. It is relatively infrequent in advanced age.

Sex. There is little difference in the incidence of the disease in the two sexes. This is particularly the case since women have become more active in outdoor life and business affairs.

Other Factors. Many and various other factors influence the disease such, for example, as occupation and social condition. These are not of sufficient importance to come within the scope of this discussion.

Etiology.—Predisposing causes. Race, nationality, age, and sex have already been discussed.

Heredity. Until recent years the disease was supposed to be hereditary. It is now known that this is seldom, if ever, so. The extent to which heredity may be a disposing factor is still a matter of dispute. It is one of those questions in medicine that has to be determined by data so uncertain that it is impossible to avoid a wide variance of opinion. One of the leading actuaries of the country does not consider heredity as a factor of any importance and where a child of a tuberculous family has not been exposed to the disease, no restriction is put upon the individual as an insurance risk. The contention of this group is that where the disease is present in a particular family the children are almost certainly exposed, that they acquire the infection and later through the action of various factors develop the active process.

It is probable that heredity is an important factor in this disease, as well as in almost every other condition of life. One sees whole families with good teeth, others with poor teeth; some families with bald heads, as the rule, and others where the condition is almost unknown; families where defective eyes are common, and others where they are the exception.

As an illustration of heredity, I heard a physician once make the statement: he knew as a child that at twenty-five he would be baldheaded, that at fifty he would have every tooth in fairly good condition, that he would never have tuberculosis or heart disease; and so far his prognosis has been absolutely correct.

Practically all individuals acquire tuberculous infection; some inherit sufficient resistance to prevent the development of tuberculous disease while others do not. It is not here contended that heredity is more than one of the many factors that influence the incidence and course of the disease, but that it is one of importance.

Exposure. This is of importance in two ways: (1) Exposing the uninfected to the chance of acquiring the organisms. (2) Exposing the individual with the latent infection to those conditions that tend to favor the development of the active disease. No matter at what age it is discovered that one was exposed, or how long the period before the time of investigation, it is still a major consideration.

Physical Defects. Any condition that interferes with the well-being of the individual will have an adverse influence. Of particular importance, however, is impairment of the respiratory function, as by enlarged tonsils or defective chest development. The exact importance of these factors has not been established, but it seems reasonable to believe that they tend to lower the resistance of the patient and at least favor the development of the active process from the latent infection.

Impure Air. This is well demonstrated by the increased incidence among those whose occupations are such that the individual is subjected to respiratory irritants, and among those who work or live in crowded, poorly ventilated quarters. It is probable that this last factor is operative in two ways: (1) The increased chances of the individual's acquiring the infection. (2) The lowering of the patient's resistance, thus favoring the development of the active disease.

Other Diseases. When the fact is borne in mind that a large percentage of the human race is carrying the infection it can readily be understood that many diseases may act as factors in favoring the development of the active process. Of particular importance are repeated colds, epidemic influenza, measles, whooping cough, pneumonia, and syphilis.

Impaired Nutrition. This is of the greatest importance. The mainstay of the treatment is improving the patient's state of nutrition and the rapidity with which the active disease may be arrested or even cured, largely by attention to this factor alone, is one of the most striking evidences of its value in prophylaxis. Although it is not unusual to see the active process develop in individuals who are in a splendid state of nutrition, this is rather the exception than the rule, and attention to this phase of well-being is one of the most important elements in the prophylaxis against the development of the disease.

Vocation and Habits. Some vocations lend themselves more to the development of the disease than others. In this class are the occupations that expose the individual to impure air, to respiratory irritants, to imperfect physical development or lowered nutrition, or anything that militates against normal development or good health.

The part that bad habits play in the etiology is still a matter of considerable uncertainty. It is probable that alcoholism or dissipation in any form, lowers resistance. Under this head might also be mentioned the tendency of some to eat irregularly, to take insufficient exercise, to wear improper clothing. In fact, here, as in the case of vocations, any factor that tends to lower the state of well-being of the individual will assist the development of the disease.

Financial Status. As this affects practically every phase of life, its influence here is naturally both direct and indirect. Poverty especially increases exposure, lowers resistance, and lessens the opportunity and the facilities for proper treatment. These matters have been discussed under other heads.

Course and Prognosis.—In making a prognosis, it is necessary to take into consideration many factors of importance. The disease is essentially a chronic process and much depends upon the conditions under which the case is handled. Where an early diagnosis is made and the best facilities for treatment are obtained, a very large percentage are cured. When the disease is diagnosed late, the percentage of cures is very small, though an arrested process is often possible.

It is of advantage here to mention the terms that are commonly employed to designate the favorable results of treatment. These are "arrested," "apparently cured," and "cured." It is sometimes of importance for the physician to acquaint the patient with the significance of these terms and to give a clear understanding of the years that are necessary for a cure to be effected.

Symptoms and Diagnosis. General Considerations.—An early diagnosis is of the greatest importance to the patient, to the patient's family, and to the community. To the patient because the chances of a cure are enormously increased. Not only is there a greater chance of a cure, but the rapidity of recovery is in direct proportion to the promptness of the diagnosis. It is of importance to the family and the community from the standpoint of the lessend exposure of others to the infection. Every individual in the world today that has tuberculosis, has acquired it through the ignorance or indifference of someone else. Where a diagnosis is made early, such restrictions can be instituted as will lessen the chances of the spread of the disease.

Value of Periodic Examinations. The medical profession, as a whole, has been derelict in its duty to the public in neglecting to declare itself on this subject. The Standard Oil Company finds it to advantage to have its gasoline pumps inspected by an expert every day. The owners of large buildings have their elevators inspected at regular and frequent intervals. Many automobile owners have a mechanic examine their cars once a month. Yet one will allow the delicate mechanism of the heart and lungs and kidneys to go uninvestigated for an indefinite period. One often hears individuals boast that they have not consulted a physician for many years. It is probable that an examination of all persons once or twice a year would prolong the sum total of human life by many years. Particularly is this true in the case of tuberculosis. If the public realized what a large percentage are carrying the infection and how easy it is for this infection to become active, it would tend to favor more regular investigation. Even the medical profession was surprised by the statistics of the physical examinations during the war.

The unfortunate tendency of many physicians is to examine their patients imperfectly. It is certainly desirable that we properly avail ourselves of what opportunities we do have to investigate the physical condition of those who come to us. This applies particularly to such items as exposing the chest for chest examinations, the more frequent making of temperature charts, more frequent examinations of sputa, and, in fact, giving attention to the many details that are often neglected or overlooked.

Attention to Apparently Simple Respiratory Conditions. It is necessary that more attention be given to persistent coughs, a tendency to frequent colds, loss of weight, chest pain, and any other suggestive symptom. A patient still presenting one or more of these should not be discharged as cured.

History.—In investigating any case of disease a carefully made history is essential, but where there is reason to suspect the presence of tuberculosis, a history should be made with the greatest possible care, directed particularly to such matters as would furnish data looking towards or influencing a diagnosis.

Tuberculosis is regarded as rather a disgrace by many; considerable diplomacy is therefore often necessary to secure correct data. A history as to whether tuberculous disease has appeared in any member of the family not only gives a clue as to the possibility of exposure, but also gives information as to the presence or absence of that indefinite quality known as family resistance.

In the light of our present knowledge of the transmission of the disease, too much importance cannot be attached to the history of direct exposure; *i. e.*, living in the same home with an active case. The entire period from birth to the time of investigation should be included.

Pleurisy. A history of pleurisy, particularly pleurisy with effusion, unless it can be explained by some other condition, such as pneumonia or injury, should be considered as establishing a probable diagnosis of tuberculous disease and the patient treated as such. It has been well shown that practically two-thirds of these cases show tuberculous disease within a few years, and it is highly probable that most, if not all, of the remaining one-third come in that group of cases in which the process has been present but was arrested or cured by the development of sufficient resistance on the part of the patient.

Pulmonary Hemorrhage. An effort is being made to establish a standard for this term, and possibly the best suggestion is to confine it to those cases where more than a fluidrachm of blood is expectorated and where there is sufficient evidence to show that it is pulmonary in origin. Where the material is frothy in character, has a tendency to float upon water, and particularly if the hemoptysis persists for several days and gradually disappears, it may be regarded as coming from the lungs. Blood coming from damaged gums or from some injury to the mouth or throat, is sometimes very hard to differentiate from blood of pulmonary origin, but where the character of the material can be investigated and a physical examination of the patient made, the source can usually be established. This is particularly so where the duration of the bleeding can be learned; the bleeding coming from an injury to the mouth usually subsides in a few minutes or a few hours at most.

Cough and Expectoration. This is one of the most persistent symptoms. The cough may be so slight as to be unnoticed by the patient or it may be so constant as to produce the greatest inconvenience. A persistent cough that cannot be definitely accounted for in any other way should always lead us to suspect the presence of tuberculous disease, and the patient should not be discharged as non-tubercular as long as the cough remains. It may be productive or non-productive in the early stages.

Pain in the Chest. With the exception of frank pleurisy any discomfort in the chest may be regarded as a symptom. A pain that cannot be otherwise accounted for should arouse suspicion and this disease considered a possibility as long as the pain persists. It may be more or less constant or only felt at occasional intervals. It may be of any degree of severity.

Frequent Colds. This is an uncertain symptom as countless persons complaining of frequent colds present themselves for treatment, who prove to be free from more serious involvement.

Loss of Weight. Sooner or later in the progress of these cases a tendency to loss of weight always develops, but one cannot exclude the presence of tuberculosis because a person is not undernourished. In some cases the disease is well advanced before impairment of the state of nutrition is noticeable. In other cases it is one of the first symptoms manifested. Unless the tendency to loss of weight can be otherwise accounted for, we are not justified in discharging a patient as non-tubercular as long as the tendency persists. Confusion frequently arises in the case of individuals who have been maintaining a high state of nutrition due to forced diet and other measures that they have been carrying out. It is therefore important to ascertain whether or not a special effort has been made to keep up the state of nutrition.

Dyspnea. Shortness of breath is present in practically all cases, sooner or later. Sometimes it is an early symptom and apparently out of all proportion to the amount of lung tissue involved. While it is a symptom that is not of great value in making an early diagnosis, it is, nevertheless, one of the many that may at times direct attention to the possibility of the disease, and sometimes materially aids in establishing a diagnosis when considered in conjunction with other findings.

Weakness. A fairly large number of these patients first have their attention directed to the fact that they are not well by a sense of weakness or lassitude, or the lack of their accustomed energy. On the other hand it is not unusual to find patients who are not conscious of any material change in their condition or of impaired efficiency.

Chills. Frank chills are not often experienced in the early stage of the disease. Later they may develop to such a degree as to lead to a diagnosis of malaria. At first the tendency is rather to chilly sensations, or slight rigors.

Fever. While this is considered more under the head of direct examination, it should also constitute a part of the history. Very often upon examination a patient will be found with normal temperature but will give a history of more or less persistent fever. This is particularly significant if it occurs in the afternoon and if there is a considerable difference between the morning and evening temperatures. An individual with a tendency to even occasional afternoon fever, however slight, should not be discharged as non-tuberculous until the symptom has disappeared or has otherwise been accounted for.

Headache. This is so common a condition that it is often difficult to attach significance to it in building up a diagnosis. A tendency to headache, particularly if it be of a rather dull type and more particularly if it appear in the afternoon, unless it can be definitely accounted for otherwise, should arouse suspicion. Often it is the first symptom noticed by the patient.

Rapid Pulse. This specifically comes under the head of physical examination, but often a patient who has sufficient knowledge of these matters gives a history of a pulse rate above the normal. This matter will be discussed further under the head of physical examination.

Palpitation. While from the standpoint of history this is not of very particular importance, still it is of sufficient value to justify investigation. In some cases there is a tendency to palpitation that is known to the patient. It is more apt to be noticeable upon slight exertion or excitement and is often accompanied by shortness of breath and a sense of weakness.

Sweating during Sleep. In some cases this is marked in the later stages of the disease, so much so as to interfere materially with the patient's well-being. In the early stages of the disease, it occasionally manifests itself to a certain extent and is one of the symptoms of diagnostic value.

Voice Changes. Independent of definite tuberculous laryngitis there is often a tendency to transient impairment of the voice quality. This is more apt to be of a sibilant character, in contra-distinction to the hoarse rasping voice sometimes present in syphilis.

Anorexia. There seems to be a definite tendency to impaired appetite, though this is far from being constant. This condition is also of unfavorable prognostic import for the reason that maintaining a high state of nutrition is so important a part of the treatment of the disease.

Distaste for Fats. Considerable stress has been laid upon this by some investigators and in my experience it has been fairly constant. The distaste does not seem to apply to all fats. The taste for butter is usually not affected and very often the patient will maintain a relish for bacon and possibly some other fats, but there does seem to be a tendency to less appetite for fat meat. It is at least a matter worthy of investigation.

Indigestion. A fair percentage of the patients who go to a physician in the early stages of tuberculosis are directed to seek medical advice as a result of this symptom. The majority, particularly in the early stages of the disease, can utilize almost unlimited nutrition if reasonable care is exercised, but if left to their own devices a certain amount of digestive disturbance is noticeable.

Nervous Phenomena. There is a tendency to an impairment of the nervous stability though there does not seem to be any definite or constant change that can be cited as evidence of the disease. The patient often complains of irritability, of being easily excited, and of an inability to concentrate. Often, however, even one with an advanced case maintains a remarkable cheerfulness.

Vasomotor Phenomena. This constitutes part of the physical examination, but often we get a history of a tendency to sensations of heat and cold, to flushing of the face, or other evidences of vasomotor instability.

The hectic flush that has been described so often, particularly with those whose complexion is favorable for its evidence, would come under this group. Some observers mention a tendency to the flushing of the cheek on the same side as the involved lung.

Insomnia. It is a question whether insomnia is more constant in tuberculosis than in any other condition of equal severity. Where there is pain or dyspnoea or a persistent cough that would naturally interfere with sleep, there is insomnia as in any other disease. Whether insomnia obtains beyond this is still an unsettled question.

Menstrual Disturbances. There is a tendency to lessened menstrual function though at times there may be menorrhagia or metrorrhagia.

Localized Tuberculosis. A history of fistula in ano, scrofula, or other extra-pulmonary tuberculosis is of the greatest possible importance in making a diagnosis.

Physical Examination.—It is not the intention here to go into complete details as to the physical examination, but merely to stress the important points.

The examination should be so complete as not only to determine abnormal conditions that may be present as a result of the tuberculosis, but also to detect the presence of any other condition that may play a part in producing the symptoms of which the patient complains or that may act as a complicating factor.

Place. The first consideration is to obtain favorable conditions for making the examination. One essential is perfect quiet. Every physician should have some room in his office suite from which noise can be absolutely excluded. If such is impossible in the office, then the examination should be made at the patient's home.

The room should be warmed sufficiently to be perfectly comfortable. It is practically impossible to do the best work when the patient is cold. In fact, it is usually desirable to have the room a little warmer than would be compatible with perfect comfort, because it seems to induce relaxation on the part of the patient.

Preparation of the Patient. Under all circumstances the chest should be thoroughly exposed. If the chest is hairy, it should be shaved in those areas where the presence of the hair would interfere with the use of a stethoscope. Merely wetting the hair does not meet the requirements sufficiently well. If the skin is moist, it should be thoroughly dried and powdered.

It is desirable to have the patient in a calm mood, as excitement will interfere with correct work. It is always advisable first to teach the patient how to relax the body and how to breathe properly, as the tendency of most individuals is to swell out the chest and to breathe with a large amount of residual air.

Repeated Examinations. In the early stages of the disease, particularly, it is usually advisable to make more than one examination before giving a verdict. We might say that there are several types of examinations:

First. There is the hasty investigation that is frequently called the "once over," that is often made in the course of a busy day when it is desirable to gain some data as to the patient's condition, but impossible to give a thorough examination.

Second. There is the thorough examination and investigation that is made with the patient properly prepared and with the added advantage of having all the favorable external factors that can be obtained, such as quiet and warmth.

Third. The early morning examination. It is unquestionably of advantage at times to examine the chest when the patient first wakes and before the accumulated moisture has been cleared out by coughing, yawning, or other forced breathing.

The patient is instructed to have the room darkened, to stay awake late the night before and if necessary to take a mild hypnotic. The physician should wake him in the morning.

He should be instructed that should he wake before the doctor's arrival, he must not expose the body, speak, cough, or do anything else that might interfere with the examination.

Fourth. Examination where the moisture has been increased by iodides. I have not found this of material advantage and believe its employment is open to question.

Fifth. Examination where the pathology has been reinforced with tuberculin. I have not found this of material value and so far it is open to question, but it is certainly worthy of further investigation. The plan is to give a hypodermic of tuberculin sufficient to produce a local reaction in the infected area. The theory is that if the infected area is in the lung, the local evidence will be increased. At the same time the temperature reaction can be observed. This injection, if used, should be given after a temperature chart is under way and the temperature reaction, if any, would therefore be apparent.

Findings.—The physical examination of the patient in the early stages of tuberculous disease may reveal very little or no evidence on which to base a diagnosis. There are certain findings, however, that are sooner or later associated with so large a percentage of these cases that their presence or absence is of diagnostic value.

Underweight. As previously discussed, there is a tendency to loss of weight in the progress of the disease and while this may not be found in an early stage of the process due to the efforts that have been instituted to maintain nutrition, still it is a finding of importance if present.

Imperfect Chest Development. Early in the disease this is not of material significance. Later, particularly in the chronic fibroid type, there may develop an asymmetry that is rather characteristic. It is probably true that the thin-chested individual with imperfect lung function is more apt to develop the active disease from an infection.

Sallow Complexion. There is a tendency as the case progresses for the patient to develop a sallow complexion. This is largely accounted for by the secondary anemia and by the confinement that is so often necessary.

Hectic Flush. This vasomotor phenomenon is often noticed early in the disease. Many have described a tendency to flushing of the cheek on the side of the involved lung.

Unequal Pupils. Occasionally there is an inequality of the pupils as a result of tuberculosis, the dilated pupil being on the same side as the lung principally involved.

Fever. This is probably a constant accompaniment of tuberculous disease. It was discussed under the head of symptoms. Very often at the time of examination the temperature will be found normal, but when a chart is made with sufficient care, it will usually show elevations above normal.

Rapid Pulse. There is an almost constant tendency to an increased pulse rate. This rapidity may not be always in evidence, but a correctly kept pulse record will usually disclose a deviation from the normal. This is also of prognostic value, as a rapid pulse is an unfavorable indication.

Hypotension. This is not a constant finding and early in the disease may not be evident at all. It should be remembered, however, that there is a tendency towards a blood pressure that is below normal. In my tuberculosis service (male, white) at The Charity Hospital at

New Orleans I never found a blood pressure above normal though weekly readings were made for years.

Rapid Breathing. The respiratory rate is sometimes increased out of all proportion to the actual lung damage. Late in the disease, of course, the increased respiratory rate is due to the combination of several factors, as can well be understood.

Cardiac Displacement. This is seldom found except in cases of pleural effusion or in the chronic fibroid type of the disease.

Enlarged Glands. There is a tendency to enlarged glands, particularly of certain groups, such as the cervical and submaxillary. Some have claimed that this evidence is almost constant. A general glandular enlargement may be suggestive.

Clubbed Fingers. There are many conditions that may account for clubbed fingers and among them is tuberculosis. Late in the chronic form this finding is almost constant.

Evidences of Surgical Tuberculosis. The evidence of a present or preexisting scrofula, fistula in ano, or other extra-pulmonary tuberculous process is of considerable diagnostic import.

Findings upon the Physical Examination of the Chest. The principal evidences of pulmonary involvement may be stated as:

First. Unilateral Impairment of Expansion. This may be demonstrated by any of the methods in common use.

Second. Change in Respiratory Sounds. The actual findings, of course, will depend upon the state of the area examined, but any difference in respiratory sounds in any one place, as compared with the same location on the opposite side of the chest, is of significance.

Third. Change in Voice Sounds. The same applies here as in the preceding paragraph.

Fourth. Rales. The type of rale will depend on the type and stage of the lesion producing them. Of particular significance are rales found in an apex. Modern observers are laying stress upon what is described as a "medium coarse rale." Crepitant râles always have been considered as highly suggestive. Especially suggestive is the crepitant rale found during inhalation after a forced exhalation. If the patient will hold his breath for a while after expiring all possible air, it favors the agglutination of those surfaces, the separation of which produces the sound sought.

Fifth. Changed Percussion Note. The changes produced will depend upon the location and character of the lesion producing them. Any change in the note as compared with the adjacent areas, and particularly with the corresponding areas on the opposite side, is significant.

Sixth. Changes in Tactile Fremitus. The same applies here as in the previous paragraph.

Laboratory Examination. Sputa. The only absolute evidence of pulmonary tuberculosis is the presence of the specific bacilli in the sputa. When these organisms cannot be demonstrated, of course it does not exclude the possibility of the disease, but merely is evidence of value. The physician should not content himself with one investigation if negative, but throughout the progress of the observation, examinations should be made at more or less frequent intervals. A good rule is to examine the sputa about twice a week in a suspected case when a specimen can be obtained; and during the period of intensive examination, it may be examined to advantage every day. Aside from demonstrating the presence or probable absence of the organisms in the sputa, other invaluable data can often be secured. Care should be exercised in obtaining these specimens to have the proper material collected, that is, material that is coughed up and not secretion from the mouth.

Blood. There is a tendency towards low total white and neutrophile counts. This is usually constant unless some complicating factor interferes. While this evidence is not of absolute value, it is of great assistance in many doubtful cases. There is sooner or later a tendency to secondary anemia and it is certainly desirable in all cases under investigation to ascertain the total and differential white count and the color index. The Wassermann test should always be made.

Urine. This gives practically no information of direct value in establishing a diagnosis. It does help in eliminating other diseases, and it is always of advantage to have information of this character in estimating the general condition of the patient and in planning treatment.

Other laboratory investigations, such as the feces examination, blood chemistry, basal metabolism reading, and various others, may be made as indicated. The basal metabolism estimates may at times be of diagnostic value.

X-ray Examination. Every suspected case should have the benefit of this investigation. Not only is it sometimes of value in establishing a diagnosis, but it is often an aid in determining the extent of the involvement. In many instances the x-ray gives no information in the early stage of the disease and at all times the report should be considered only as evidence and used in collaboration with all other data obtained. A good plan is to send the case to a competent roentgenologist and have him report his findings and x-ray diagnosis; later to go over the films with him, at that time stating in detail the apparent location and extent of possible lesions and with the aid of complete physical findings have a re-reading.

Diagnosis by Elimination. Very often in the early stages of tuberculosis, it is impossible to make a positive diagnosis on the findings obtained by repeated examinations. Sometimes a comparatively certain diagnosis can be obtained by eliminating all other possible factors that might account for the signs and symptoms that the patient presents. For example, if the patient has a persistent cough, a tendency toward afternoon fever, and possibly some other suggestive symptoms, and thorough investigation fails to show any other possible cause, at least a tentative diagnosis of tuberculous disease is justified and the patient given the benefit of prompt and efficient treatment directed along that line.

A Routine Examination for Suspected Cases. There is the greatest possible variety in the methods of investigating cases of suspected tuberculosis and it would be advisable to have established a routine examination to which all of these patients would be subjected. This would have several advantages. The coming generation of physicians would have a standard to follow that could be added to or subtracted from only in the light of definite information, very much as in carrying out the standard treatment for malaria. We would also be able to know with more certainty what investigations had been made when a suspected case had passed through other hands.

In the hope that it may be of some interest and advantage to others, I will here give the routine that I have tried to follow in my own practice and which I have insisted on in my teaching for many years:

Arrangements are made to have the patient under observation for at least one week.

At the first consultation there is a general discussion of the case. The main points brought out at this time are, of course, fully recorded. At this time arrangements are also made for further investigation.

1. A history as complete as possible is made.

2. A general physical examination is made and recorded. At this time the greater part of the physical examination is completed, such as the condition of the skin, special senses, reflexes, and the abdominal findings. The lungs are investigated as thoroughly as opportunity will permit.

3. A temperature chart is started and the patient is given detailed instructions as to the hours of taking the temperature,—usually every three hours, when awake, for one week. He is given a tested thermometer or instructed to get a thermometer which should be tested as to its accuracy at the first opportunity.

4. Specimens of the blood and urine are taken or arranged for.

5. A series of sputum specimens are arranged for. These are usually requested to be sent, one every other day while the patient is under observation.

6. An x-ray examination is arranged for.

7. Unless definite evidences are obtained at this time, arrangements are made for at least two more physical examinations of the chest during the period of observation. One of these is made in the early morning, immediately upon the awakening of the patient as has been previously discussed. I find that I make an average of three or four chest examinations in all.

8. If, during this period of observation, the organisms are demonstrated in the sputa and a diagnosis thus definitely established, the investigation is then continued only enough to establish the extent of the involvement, the presence of other diseases or complications, and the general condition of the patient.

9. At the close of the period of observation the sum total of all the evidence is considered and a final opinion given. If it is a referred case, he is returned to his physician with all the data obtained.

or if the case is one for treatment, the proper instructions are given in writing.

Prophylaxis.—This may be considered under several heads:—

First. State. Those general measures that are part of State supervision.

Second. Personal. The care of the individual patient to prevent his spreading the infection.

Third. Public Education. The individual care that should be exercised by the non-tuberculous to prevent their acquiring the infection.

1. State Regulations.—The medical profession should lend its best efforts to securing adequate laws that would lessen the spread of infection, and should help to educate the laity to respect and observe those laws that are passed. This should include such matters as housing regulations; supervision of dairies, hospitals, schools, public conveyances, and all buildings open to the public; as well as the reporting of cases and the prevention of indiscriminate expectoration.

2. Care of the Patient. Isolation. The patient should be isolated as far as circumstances will permit. Sleeping quarters should be provided exclusively for his individual use. This will sometimes require considerable rearrangement of the household, but it is seldom that the family will be found unwilling to co-operate when they have been sufficiently convinced of the importance. All visitors should be excluded, particularly children.

Education of the Patient. The patient should be educated to use precautions that insure the protection of others. Too much time cannot be spent in this important matter. Sometimes the ingenuity of the physician is taxed to the utmost to secure sufficient co-operation. For example: a patient may be told that every case of tuberculosis in the world today is the direct result of someone's negligence or ignorance and that someone has passed the disease on to him when it might have been prevented: that he can appreciate the inconvenience and suffering that goes with it, and that he should certainly be willing to make every effort to prevent carrying it to someone else.

Among the particular instructions might be included the following:

Coughing. The patient should be instructed to cough as little as possible, particularly in the presence of others, and always to cover the mouth with some cloth that is burned or boiled after use.

Sputum. The patient should use the special vessels for the purpose or should expectorate on sawdust, or sand, or some other material that can be burned or sterilized by heat. In bedridden cases the sputa may be collected on paper napkins or other material, and burned.

Eating and Drinking Utensils. Eating and drinking utensils should be for the individual use of the particular patient. These should be boiled or cleaned by the proper use of hot water and even this should be done separately from those for the rest of the family.

Clothing. All clothing worn by the patient, as well as the bed linen, should be cleaned by boiling. In ambulatory cases, of course, the outer clothing cannot be treated in this way, but these garments should be for the patient's own use exclusively.

Handshaking and Kissing. These should be strictly prohibited.

No matter how much care is used in going over these details, it is frequently found that their importance has not been impressed sufficiently on those concerned. For example:—

Some time ago I had a case of a woman with pulmonary and laryngeal tuberculosis. She had several nieces and nephews of whom she was very fond. I explained to her and to the parents of these children the danger of contact, yet I later found that these children had been brought almost daily to her room surreptitiously and had remained there for some time. Two of them have since developed tuberculosis.

3. Precautions to Prevent Acquiring the Disease. Eugenics. It has been definitely demonstrated that tuberculosis is not hereditary, but at the same time it seems certain that some families have less resistance to the organisms than others. This has been discussed elsewhere. It is hard even to estimate the extent to which heredity is a factor in family life. It is certainly true that some families inherit teeth that resist the ordinary causes of dental decay; that some inherit hair that is resistant to the usual scalp diseases that cause baldness. The same applies to a greater or less extent to other parts of the body. I believe that it applies to the lungs and, while all of us probably acquire the infection, some inherit a resistance that tends to prevent the ravages of the disease.

Care of the Child. It is evident that a fairly large percentage of tuberculous infection is acquired in childhood. Therefore, every effort should be made to prevent the exposure of the child to the infection.

It is acknowledged that the building up of the general state of well-being of the individual is the best measure in treating the disease. It would certainly seem, therefore, that the best prophylactic measure would be to give the child that care that tends to make not only a strong healthy child of to-day, but a strong, healthy man or woman of tomorrow. This includes attention to all those details that it is not within the scope of this article to discuss.

Ventilation. Adequate ventilation should be provided at all times and in all places where any person is required to stay. This includes homes, schools, and especially places of business.

Proper Breathing. All persons, particularly children, should have the benefit of those measures that tend towards proper chest development. This includes the breathing exercises, proper posture in rest and exercise, and good general development.

Attention to Other Diseases. All conditions that lower vitality should naturally receive due attention. Of particular importance are respiratory obstructions, such as enlarged tonsils or adenoid bodies. A tendency to frequent colds demands careful investigation and attention to relief.

Clothing. Young persons especially are apt to neglect themselves in this regard. The child should be supervised in this, as in all other matters that tend to promote a state of well-being and prevent disease.

Exercise. There are few things in life that tend more towards promoting health than properly regulated exercise. These things should not be left to the chance inclination of children or even to the ignorant gropings of adults. They are matters that require the expert advice of a physician, and the doctor who fails to grasp the opportunity to render this service to those who look to him for health, is derelict in a definite obligation.

Diet. A proper state of nutrition is the mainstay in treatment and it seems only reasonable to suppose that if proper diet would tend to relieve a developed disease process, it would tend also to prevent its development. I believe that a properly maintained state of general well-being is one of the greatest prophylactic measures, not against acquiring the infection, but against the infection's developing into the active disease. It is possible that milk may have particular value in this direction.

Vocation. Certain vocations favor such processes as acute respiratory infections, or are inimical to the maintenance of a high state of nutrition, or in various and sundry ways interfere with the well-being of the individual. When a vocation of this type is followed, the risk should be understood, particularly in those cases where the individual has reason to suspect that he is harboring the infection or that his resistance to the disease is below par.

Avoiding Exposure. In spite of the present tendency to consider most tuberculous infections as being acquired in childhood, I believe that it is a measure of the greatest importance, even in the case of an adult, to avoid coming into contact with infected individuals or infected premises. It is certainly a matter of the utmost importance in the case of children.

As an illustration: When in the wholesale drug business, we employed in the packing room two negroes who had been with us for years and seemed to be in perfect health. Their work became so heavy that an additional packer was employed. In the course of a few months it was found that he had tuberculosis. He was immediately removed, but in less than a year both of the other packers had died of the disease. Almost any physician of experience can cite numerous cases of this type.

Infected Premises. A house in which an infected patient lives should not be visited except when necessary. This has been previously discussed. A house in which there has been an infected case should not be occupied until after proper measures have been taken to remove the infection. These measures should include painting, or papering of every inch of floor and wall space.

The exact status of the danger of infection from this source has not been established, but it is best to give those looking to us for protection the benefit of the doubt. The following incident will illustrate:

In upper New Orleans there was a young man who developed tuberculosis and, after being treated at home for some time, went to a sanatorium in another state. The home was next occupied by two families who were related. Both of these families came to this place apparently entirely free from any trace of tuberculosis. Within less than two years both families had developed cases of tuberculosis and moved to other sections for sanitorium treatment.

Treatment. General Considerations.—It should be remembered that as there is no specific treatment for this disease, the matter resolves itself into the care of the patient as a whole. It might be said that we treat the patient and not the disease.

Where to Treat. As soon as the diagnosis is made, the question has to be decided as to where and under what conditions the treatment will begin or be continued. This is a matter of interest particularly from the standpoint of whether or not the patient will be treated at home or in a sanatorium. This question can only be properly answered by taking into consideration all of the factors, such as the conveniences at the patient's home, the domestic status, the financial condition, the stage of the disease, and the personality of the patient, especially from the standpoint of securing his co-operation.

Sanatorium. Advantages. One of the advantages of the better class of these institutions is that they are usually located so as to give the patient the benefit of what value there may be in climatotherapy. It is not probable that there is any specific climate in the treatment of this disease, but it is certainly true that an institution located well out in the open and in a section that is favorable from the standpoint of good, pure air, and freedom from smoke, dust, and noise, would offer some advantage. The tendency of the medical profession is away from the belief that climate itself has much influence on the disease.

One of the most important advantages is that of education and this is almost indispensable in certain cases. At a good sanatorium the individuals are taught how to care for themselves and how to protect others. Not only are they instructed but they are disciplined in this.

Another advantage is that they live under a discipline sufficient to insure their carrying out such measures as proper rest, diet, and fresh air. They might object to these matters in the home or consider them so difficult that they hardly make an effort to comply with the instructions. There is the benefit in the sanatorium of the example of others as the patient sees all carrying out orders of every type. The "mob spirit" is infectious and is probably one of the greatest factors in enabling the medical staff to secure the necessary co-operation.

Another particular advantage of an institution is that it removes other members of the patient's household from the danger of infection.

Moreover the sanatorium presents so complete a change that patients are thrown out of their former routine and into an entirely new life. They are removed from moral support in their perverseness and there is an opportunity in every way to inaugurate a new order of living.

Disadvantages of the Sanatorium. The one that is most often a deciding factor is the expense. The cost at the better class of institution is usually too high to be met by the average patient, and the value of the cheaper institution is often questionable. Another factor is that of inaccessibility. The location is sometimes at a considerable distance from family and friends and, if the case does not progress favorably, there may be considerable inconvenience to the patient or others.

In many cases the man of affairs, who is not sufficiently ill to be actually incapacitated, may continue the supervision of business while he is being treated at home. In a sanatorium, of course, he would be entirely isolated.

Type of Case for Sanatorium. Sanatorium care should be advised on the basis of the following.

1. If the patient has sufficient means to go to a good institution and remain as long as is necessary.
2. If the patient is living in a hotel or boarding-house or if his house is located in a congested district or does not offer the proper facilities for treatment.
3. If others, particularly the children in the home, would be exposed to infection.
4. If co-operation cannot be obtained, either in carrying out instructions for his own benefit or in the protection of others; in which case the stay should be at least long enough for the necessary education to be acquired.
5. If a change seems to be indicated, as with those patients who have grown tired of the home routine, especially the home diet. Going to the sanatorium is an entire change, and coming home, to a certain extent, constitutes another. This is very often of marked advantage.

In this article we will not attempt to discuss sanatorium treatment.

The Home. Among the advantages of treating the patient in the home might be mentioned:

First, the economy.

Next, the value of the patient's continuing under the supervision of his physician.

Also, when the patient is not sufficiently sick to be incapacitated, a limited supervision of his affairs can be maintained and he can be in touch with his family and friends.

Disadvantages. Among these might be mentioned particularly the lack of institutional discipline and the difficulty in educating the patient to care for himself and to protect others. This is especially true in those cases where competent nursing is not available. The wrong of exposing others to the infection must not be underestimated.

Another factor that may be of weight is the lack in some homes of the proper therapeutic aids such as fresh air, sunlight, freedom from noise, and modern conveniences.

Type of Case for Home Treatment. Among the considerations that would influence a physician to keep the patient at home are the following:

1. Financial means insufficient to enable the patient to go to a good sanatorium for an adequate length of time.
2. A home where there are no young people and few adults that would be exposed to infection.
3. A home so located as to insure for the patient proper physical advantages, such as fresh air, sunlight, and quiet.
4. A patient too ill to be removed or where the case is so hopelessly advanced that it is only a question of a short time under any circumstances.

General Care. Quarters. Where possible, a corner bedroom, a screened porch, and a bathroom should be assigned to the patient. These should be isolated, as far as possible, from the rest of the household. It is particularly desirable that they should not be used as a passage-way for others. Other factors should be considered, particularly freedom from noise, the direction of prevailing breezes, and the maximum of sunlight.

The furniture should be as simple as possible and nothing used that cannot be cleansed afterwards. At the same time, it is desirable to make the room thoroughly attractive and cheerful.

It is desirable in any room where a patient is to be confined for any considerable length of time, that there be no gaudy wall-paper or pictures of an unwholesome nature or anything that might detract from an atmosphere of peace and quiet. For example, pictures such as "Nero at the Circus" might well be replaced by a simple rural landscape; that is, if pictures are used at all.

The furniture should be limited to what is necessary for the convenience and comfort of the patient and the attendants.

Bed. It is usually desirable to permit the patient to use the bed to which he is accustomed. Many individuals are so habituated to one bed that they cannot sleep comfortably in any other, and under these circumstances, if the bed meets with the other requirements fairly well, there is no advantage in changing. It is best to have a metal bed, if possible, and one without a solid headboard or footboard, as these interfere with ventilation. Where the patient is bedridden, a high, narrow, standard hospital bed will be more convenient for the nurse.

The mattress should be soft and elastic so as to give the maximum of comfort and yet have sufficient firmness so that the patient does not sink down in it. The covering should be as light in weight as possible and still give sufficient warmth.

When the patient is in a fair state of nutrition, particularly if he is up part of the time, there is little danger of bed sores, but when he is bedridden, especially if he is thin, these must always be considered as a possibility and precautions taken to prevent them.

In cold weather the patient must be warmly clothed and under these conditions the thin, low-necked and shortsleeved gowns are not to be permitted. The knitted aviator's helmet, that covers the head and neck and exposes the face only, is often worn with comfort.

Rest. This is one of the most important factors in the treatment of the disease. There are three types of cases from the standpoint of rest:

First. The bed case, in which the rest is almost absolute.

Second. The chair case, in which the rest is materially modified.

Third. The ambulatory case, in which certain restrictions are imposed, and these depending upon the condition of the patient.

Rest in Bed. Among the indications that would call for rest in bed is a considerable loss in weight. Sometimes when patients are comparatively comfortable and free from temperature, but still show a tendency to lose weight or a failure to gain weight under treatment, it is of distinct advantage to put them to bed for weeks or even months in order to enhance the state of nutrition.

Almost any patient with an appreciable elevation in temperature should be kept in bed until this has definitely subsided. A rule that has been frequently carried out in the handling of this disease is that when the patient's temperature goes above 100, he is put to bed until the temperature has been not over 99 for several days.

Rest in bed is also an advantage in reducing cough, lowering the pulse rate, and often in lessening discomfort, such as headache or chest pains.

Hemorrhage pleurisy, dyspnea or any one of many other possible developments call for complete rest.

While it is sometimes necessary to keep patients absolutely in bed, requiring them to use a bed-pan and to be bathed by the nurse, yet if they are not sufficiently ill to make this imperative, they will often co-operate with the bed treatment better if they are allowed to go to the toilet for intestinal elimination and sometimes to take their daily bath.

Rest in Chair. In this type of case the patient is kept in bed most of the time, but spends a part of each day in a comfortable chair. This type of treatment is often indicated in those cases that are progressing favorably as to cough, pulse rate, and temperature. It is always advisable that the bed case become a chair case before becoming ambulatory.

Sometimes a moderately ill patient will do better in a chair if he suffers from pressure pains when lying in bed, or if his living quarters are such that it is necessary to move him from place to place in order to get the advantage of sunlight or breezes.

Ambulatory Cases. The patient that progresses favorably, sooner or later becomes an ambulatory case. Sometimes it is impossible to impose restrictions on even a very ill patient. Let me illustrate this by two cases in my own experience:

A structural steel worker, who had a wife and child, came to me in the middle of a cold winter and was found to have fairly advanced tuberculosis. He had pleurisy, was running a high temperature, and had evidence of considerable involvement. I immediately recommended rest in bed. He replied that he had no means and no one on whom he could call, and that if he went to bed, he and his family would be destitute; that he was going to continue his work and wanted me to do the best I could for him. I had him remain in bed, under as favorable conditions as possible, all of the time he was not actually engaged in work, and instituted other necessary measures as a proper diet, etc. He made an uneventful recovery, was promoted to the position of foreman, and later enjoyed health and prosperity.

A young man came to my office late one winter evening when it was bitterly cold, raining and sleeting. He had a temperature of 103 and so extensive a pleurisy that tight strapping was necessary to give him even moderate comfort. He had a frank case of tuberculosis and I ordered absolute rest, etc. He said that he was a firemen on a passenger engine; that it had been the ambition of his life to become an engineer; that he was expecting to be promoted to an engineer's place in a few weeks; that dropping out would probably do away with all chance of promotion; and that he expected to occupy an engineer's seat if he was only able to pull the throttle one time before dying. I instituted what measures I could for his relief; he kept his position without losing a day, made an uneventful recovery, and achieved his life's ambition.

Cases of this type do not entitle us to minimize the value of proper treatment, but they do convince us that favorable progress is sometimes possible even under unfavorable conditions.

Fresh Air. This is one of the three essential factors in treatment. This matter has been discussed in part in previous paragraphs and it is only necessary here to re-emphasize the fact that one should take advantage of every means possible to give the patient sufficient fresh air under favorable conditions, and, at least, to have the patient spend twenty-four hours a day on a screened porch. Even after the case has been apparently cured, sleeping out should be a life habit.

It is always of advantage to have assigned to the patient a screened porch and a bedroom, the bedroom being used for stormy weather or when some acute condition necessitates a certain amount of indoor care. The bedroom is of particular advantage for the purpose of bathing.

Nursing. Particularly in the bed-case and to a large extent in the chair-case, good nursing is essential. Where the means of the patient will justify it, he should have trained assistance. It goes without saying that the nurse should not occupy the same sleeping quarters as the patient; in fact it is decidedly inadvisable for a nurse to try to do double duty in these cases.

Where the patient cannot get a trained assistant, a practical nurse can often carry out the necessary measures under the supervision of the physician. If even this is not feasible, some member of the household should be assigned to care for the patient and all others excluded.

Care of the Body. Under all circumstances the body should be kept clean by at least a daily bath. When the patient is bedridden, particularly if he is thin, massage is of advantage. The alcohol sponge, or sponging with witch hazel, is often helpful. After the bath and sponge, the use of some simple talcum powder promotes comfort and tends to favor a good condition of the skin.

The teeth and mouth should be thoroughly and regularly cleaned, at least two or three times a day. It is of advantage to do this each time after taking food. It should always be done after each regular meal. Many suggestions have been made as to mouth-washes. In our present state of civilization, a large percentage of individuals have some favorite mouth-wash and there is usually no objection to continuing the one liked best.

It is certainly desirable to have the chewing facilities put in the best possible condition and kept so.

Men usually feel more comfortable when proper attention is given to shaving, hair-cutting, and other measures to which they are accustomed.

Occupation and Exercise. Except in the case of very ill individuals, it is advisable to make some plan for employing the mind and engaging the interest. Occupational therapy has been well worked out in some of the larger sanatoria, particularly those that care for our disabled soldiers. With women it is often of advantage to have them do a little handwork, such as knitting or crocheting. Men can be allowed some light interesting work such as drawing and carving. As convalescence is established, these activities may be increased, always having in mind the avoidance of any physical tax or mental strain.

When convalescence has been definitely established, it is best gradually to undertake active exercise, beginning with walking, and progressing into any light work by way of occupation or recreation that may be carried out without material physical effort. These matters have been extensively discussed in recent medical literature. It would certainly seem desirable gradually to restore the patient to a state of bodily vigor by carefully regulated, systematically increased physical training, always avoiding excess.

Diet.—The matter of diet is the most important consideration in the treatment of tuberculosis, the only two comparable to it being rest and fresh air.

It is particularly important to understand that each case must have individual treatment. It is impossible to make definite rules to which one should try to hold every patient. Not only must the diet be suited to the particular patient, but it is usually necessary to change the diet from time to time to meet changing conditions. Among those cases that call for specialization in diet are: the patient very ill from any standpoint, the patient running a high temperature, the one with some form of indigestion, and the one with a known intolerance of food.

There is also considerable difference in the requirements according to the state of nutrition of the individual. A patient who is much too thin will naturally require more forced feeding than the one who is normal or overweight.

Requirements of Diet. There are certain generalities that should always be borne in mind.

First. The diet should satisfy the nutritional needs, these needs to be indicated by the condition of the individual.

Second. The diet should be within the digestive ability. Any food that is not digested not only is without value to the patient, but may be an actual menace.

Third. Small feedings. It is usually inadvisable to give a patient, particularly a very ill one, two or three large meals per day. He is more comfortable, and the food is better handled, if it is divided into several small feedings.

Fourth. Palatable. In order to secure the co-operation of the patient in taking enough food, and also to insure proper digestion, it is desirable that it be pleasing to the patient.

Fifth. Properly Served. This is a valuable aid to both appetite and digestion. It is probably best to serve a patient only what it is intended that he should eat. Usually where a large amount of food is served, with the idea of the patient's eating what he wants of it, he will eat less than if a smaller amount had been served with the understanding that he must eat all of it. It is an excellent rule to have the food served in the best china, using the best silverware and the best linen of the household, and in every way possible to make the meal attractive.

Sixth. Changes. At times the usual appetite and digestion of the individual may be interferred with by an acute attack of fever, cough, nausea, diarrhea, or any one of many other possible conditions, which would make it necessary to change the diet to meet these other requirements.

Seventh. Forced Feeding. When the state of nutrition is appreciably lowered, it is sometimes necessary to use strong persuasion and every effort to induce the patient to take enough food.

Articles of Diet. It may not be amiss here to review briefly some of the data relative to the foods that are most commonly employed in feeding tuberculous patients.

Milk. This is by far the most valuable article of food, and by many it is claimed to have some actual medicinal value. Fresh milk is certainly rich in vitamins and is one of the great, well-balanced articles of diet. Milk has another distinct advantage in that it can usually be taken in addition to other food, instead of in place of it. It has a caloric value of about 320 calories per pint. There are several ways in which milk may be served:

First. With other food, as in milk soups, ice cream, custard, chocolate, cocoa, tea and coffee, and on fruits, cereals, etc.

Second. Milk may be given plain, either as part of the between feedings or with the regular meals in place of water. An excellent plan, particularly in the ambulatory cases, is to have a pint of cold milk put by the plate at each of the three regular meals. Let the patient start drinking this near the close of the meal, in place of using water or iced tea, and have it understood that any part of this milk which is not used during the meal is to be taken an hour and a half after. When given this way, it is well to allow him to use part of the milk on the cereals or fruits served.

Third. Milk Shakes. An excellent formula is:

One whole fresh egg,
One heaping tablespoonful of malted milk,
Flavor (as a tablespoonful of syrup of chocolate),
Ice,
Milk to fill the shaker.
Shake well and serve fresh.

It is best to take this about two hours after meals, as an interim feeding. Sometimes it can be taken to much better advantage if a few plain cakes, or something of that sort are served with it. This formula has a food value of 350 to 400 calories, is usually taken in addition to the regular food, and does not seem to interfere appreciably with the appetite for the following meal. The food value may be much increased by using part cream. It is particularly palatable and seems to be easily handled by the digestive tract.

It seems that patients tire of milk shakes more quickly if they are made too sweet; also if the same flavor is used too often, particularly when vanilla is employed.

Fourth. Milk Products. Cream has a food value of about 800 calories per pint. Some patients can take it plain with relish. It is usually better served with food; that is, in tea or coffee, on fruits or cereals, etc. The average patient can take in this way about a half pint or more of cream per day with perfect convenience.

Butter has a food value of about 200 calories per ounce. It is relished by the vast majority of people and is served with food. By careful management any reasonable amount can be given.

Buttermilk has a value of about 160 calories per pint. It is not a valuable article of diet in trying to build up the weight of a patient, except where a sufficient amount of cream is restored to it, or where the buttermilk has been made without the removal of the cream. Prepared in this way it may be used to advantage in those cases where it is relished, especially as a change, if one has become tired of plain milk.

Cream Cheese is easily handled by the digestive tract. It has little food value except as a vehicle for the serving of cream and sugar.

Malted Milk and Similar Preparations. These have a food value of about 120 calories per ounce. They may be given in the milk shake or served in the form of a beverage made up with milk or hot water, or milk and water, or cream may be added. The patient can usually take from one to three ounces per day. Children who have taken in infancy some artificial food may often retain a taste for it that will enable them to take considerable quantities in their regular diet.

Eggs have a caloric value of 60 to 85 each, depending on the poultry stock from which they are obtained. They may be served in several ways. Probably the most satisfactory way is raw, as an ingredient of the milk shake. They may be profitably used soft-boiled or soft-poached. In the form of custard they often constitute a valuable interim feeding. I have frequently allowed a patient, when he has become tired of milk shakes, to change to custards as it suited him, although giving preference to the milk shake.

Cereals such as oatmeal, cream of wheat, grits, cornmeal mush, soft rice, and sundry others, are easily handled and can usually be served in such quantities as to have considerable food value. There is a great difference in the various estimates of the caloric value of these. This depends somewhat on the method of preparation. The average tablespoonful of cooked cereal probably has a food value of 50 calories.

Breads. Toasted light bread is probably the most desirable, though in most cases any plain bread may be used, such as untoasted light bread, crisp beaten biscuits, plain crackers, etc. Bread, as usually served, has a value of about 75 calories per slice. It is also a valuable vehicle for the administration of butter.

Fruits vary through so wide a range in their value, that it is hard to make a definite statement. For example, a first select orange, such as we get from the citrus belt in Florida, averages about 100 calories. Fruits are palatable and they are often taken in addition to the regular meals. They have some laxative effect and they serve as a vehicle for the administration of sugar and cream.

Sugar has a value of about 120 calories per ounce. By employing milk-sugar considerable quantities may be given where it is desired to increase the caloric value of the food intake. There is little trouble in administering from three to four ounces of milk-sugar per day. It is served in tea, coffee, fruit juices, on the cereals, and in various other ways.

Potatoes. Irish potatoes and sweet potatoes (yams) form very valuable articles of food in these cases. They are relished by most patients and can be served in so great a variety of ways that there is little danger of the patient's tiring of them. Their food value is relatively high and they also form an excellent vehicle for the administration of cream and butter.

Lentils. Fresh beans and peas are not only palatable and easily digested, but have a relatively high caloric value, and form a pleasant variation in the diet of a patient who is in a condition to digest them.

Other Vegetables. Many other vegetables, such as creamed cauliflower, creamed carrots, beets, etc., can be handled by many patients. Some of them, at least, are palatable to most individuals and may be used freely to vary the diet.

Meats. When the patient's condition is such as to justify including meats on the diet list, they constitute a valuable aid in maintaining and enhancing nutrition. Among those that are of particular advantage from the standpoint of digestibility and food value are breakfast bacon, broiled steak, and poultry. Bacon particularly has a very high food value, and all are certainly welcome additions to the diet of most individuals.

Special Dishes. There are many special dishes, such as gelatin, Spanish cream, blanc mange, charlotte russe, hot cocoa, ice cream, and various others that are palatable, highly nutritious, and easily digested. They are very gratefully accepted by the patient in most cases and form a pleasant variation in the menu.

It will be seen at a glance that by using only the articles mentioned, the patient may have considerable highly nutritious food; and by combining a few of them, a high caloric diet may be given. For example:

Where the patient is not acutely ill and the digestive ability is fairly good, he can usually be given, employing the various combinations—

3 pints of milk per day	960 calories
One half pint of cream	400 calories
Three eggs	225 calories
One ounce of butter	200 calories
Two ounces of milk sugar	240 calories
Two ounces of malted milk	240 calories
Cereals	200 calories
Bread	200 calories
Fruits	200 calories

Add to these special dishes, potatoes and other vegetables, and probably some meats, and the patient will be found to be taking everything that can be wished for in the way of nutrition.

Written Diet List. In sufficiently advanced cases, it should be the inviolable rule to give the patient a written list of what he can eat and require adherence to it.

The ambulatory case, with full digestive ability, often may be given a list merely stating what he should not eat. This will be discussed later. There are many advantages in favor of a written and restricted diet list. One is that there is no danger of the patient's taking food that would be harmful. He will also avoid taking food which in itself is not harmful, but which will take the place of wholesome food of greater caloric value. A written list suggests to the patient or those caring for the patient what to serve, and it will be found that the case given a written diet list will get probably twice as great a variety as will the one that is left to the haphazard planning of an uninstructed household. It is sometimes of advantage to give patients the caloric value of articles on the diet list and some idea as to their own caloric requirements. I have repeatedly supplied patients with the excellent article on feeding in typhoid fever published some years ago by Coleman in the Medical Clinics of North America. It answers almost equally well for tuberculosis.

It has seemed sometimes of advantage to exclude from the diet some articles of food that the patient seems to wish, the idea being that denial of his wishes helps him to acquire a general appetite. Another help is to add something new to the patient's diet from time to time. Where there is a tendency to anorexia, this seems of decided advantage.

I have often made the statement that I considered one advantage of a restricted diet list was the opportunity for occasional additions, which made the patient always glad to see me.

Additions to the Diet. Beginning with a restricted diet, as the patient improves or as his ability to handle food is demonstrated, additions to the list are made from time to time. I often allow the patient to interest himself by making a list of articles that he would like added.

Final Diet in Convalescence. When the patient reaches that point in convalescence where his digestive ability is normal, he may be released from the detailed list and given a memorandum naming only those articles which he may not take. This list consists of foods that might be harmful or that might take the place of some more desirable nutrition.

Symptomatic Treatment.—As previously stated, there is no specific treatment for tuberculosis, but much can be done for the patient in the way of alleviating the many disturbing symptoms that present themselves. Not only does this contribute to the comfort of the individual, but often accelerates a favorable progress.

Cough. This is one of the most commonly found and one of the most distressing symptoms that these patients present.

It is well to bear in mind some of the factors that cause coughing in these cases. One of these is the accumulation of material in the bronchial passages and, for the removal of this, a certain amount of coughing is but a conservative process of nature. A moderate amount of cough provided it does not interfere with the patient's comfort should not be prevented by medical measures. Cough is very often largely a matter of habit. It is occasionally due to an involvement of the larynx.

Relief of Cough. Rest. Among the measures that are most valuable in the treatment of this symptom is rest. This should be both mental and physical. It should mean the exclusion of all factors that would tend to increase the respiratory act or affect the circulatory function. It has been claimed that rest in bed reduces the cough in this disease by one-half. It is particularly desirable to diminish the necessity of the patient's talking, and to avoid restlessness or unnecessary movements.

Fresh Air. Some have claimed that taking the patient out of a closed room into the fresh air reduces the cough by nearly one-half. It is certainly one of the main helps in treatment.

Avoiding Exposure. The chilling of the surface of the body will often induce a paroxysm of coughing. I remember one ambulatory case who was not conscious of coughing at all except when he disrobed at bed time and when he left his warm bed in the morning, at those times being seized with a violent paroxysm due to the chilling of the surface of the body. The remedy here was very evident.

Education. Much of the coughing done is unnecessary for the purpose of removing secretions. In many cases the patient can be educated to this fact and learn to suppress the cough to a large extent. In some sanatoria for the treatment of tuberculosis, this measure has been carried out extensively.

Local Applications. Sometimes a measure of relief may be obtained by applications to the chest of a hot mustard poultice or various volatile preparations, such as camphorated oil and turpentine. These latter probably act principally as inhalants. The following prescription will illustrate:

		or
Spir. Camphoræ,	f℥j	30.0
Olei Terebinthinæ,	f℥j	30.0
Olei Olivæ,	q.s. f℥iv	120.0

M.
Sig.—Apply on flannel as directed. (Shake-label.)

Inhalations and Sprays. These sometimes give considerable relief, particularly where the immediate cause is laryngeal or pharyngeal irritation.

		or
Mentholis,	ʒj	4.0
Camphoræ,	ʒj	4.0
Tinct. Benzoini Co.,	q.s. f℥ij	60.0

M.
Sig.—Use a teaspoonful to a pitcher of hot water as an inhalation.

Oral Medication. When the cough is of sufficient violence to interfere with sleep and rest or where it is exhausting or is productive of pain, and fails to yield to simple measures, codeine may be indicated. It is probably best to give this in 1/4 grain (0.015 Gm.) tablets, to be used only in sufficient amount to bring the symptom under control. It is understood, of course, that this is merely an emergency measure and not one for continued use. The 1/4 grain (0.015 Gm.) tablets of codeine phosphate, repeated every three hours until relief is obtained, usually meets the requirements.

Some other formulae that may be used at times are illustrated by the following:

		or
Ammonii Brom.,	ʒij	8.0
Spir. Chloroformi,	fʒiv	15.0
Tinct. Opii Camph.,	f℥j	30.0
Syr. Tolu.,	q.s. f℥iv	120.0

M.
Sig.—Teaspoonful every two to six hours as needed.

		or
Potassii Citratis,	ʒj	30.0
Limonis Succi,	f℥j	30.0
Syr. Acidi. Citrici,	f℥j	30.0
Aquæ,	q.s. f℥iv	120.0

M.
Sig.—Teaspoonful in water every two hours.

Drugs should not be used for the relief of cough except when definitely indicated, as agents of this kind impair appetite and digestion or otherwise interfere with favorable progress. Much of the cough medicine used is unnecessary. I once saw this illustrated in the Charity Hospital of New Orleans. One service contained fourteen patients all of whom were being given cough medicine as a routine measure. There was a change of service and the new staff discontinued this medication in all but two cases not only without inconvenience but with apparent benefit.

Fever. Causes. Until recent years it was believed by most physicians that fever in tuberculosis was the result of mixed infection. It has been fairly well established now that the bacilli of tuberculosis may directly produce the febrile reaction.

Other factors conducive to the production of fever are mixed infection, the absorption of toxic material from the intestinal tract, complicating infections, inanition and dehydration.

In combating these symptoms, it is highly probable that in the past much damage has been done. It is now considered seldom, if ever, permissible to use antipyretic drugs in these cases. Where the patient is properly handled, except in the very advanced stages, fever is seldom high enough to interfere materially with comfort.

Relief of Fever. Among the measures that can be employed with safety is rest. This should be both mental and physical. It includes a sufficient amount of sleep and freedom from any factor that would tend to increase the cardiac or respiratory activity.

Fresh Air. The value of this cannot be over estimated.

Ice Bag to the Head. In febrile cases this not only has a tendency to reduce the temperature, but contributes much to the comfort of the patient.

Baths. It is seldom, if ever, desirable to use hydrotherapy as we do in typhoid fever, but there can be no objection to some modification, such as a warm sponge bath, though even this is rarely indicated.

Elimination. In tuberculosis, as well as in all other diseases, intestinal elimination is an important factor in preventing or reducing fever.

Diet. Feeding the patient beyond his digestive ability is often a cause of high temperature. It is certainly desirable, in the presence of any considerable fever, to feed the patient with such care as to avoid augmenting the trouble.

Headache. Headache is often a result of toxemia, just as is the fever. Other contributing factors are hyperpyrexia, indigestion, constipation, worry, and loss of sleep. Among measures that may be instituted for the relief of this condition is rest. This should be both mental and physical and should include a sufficient amount of sleep.

The control of other distressing symptoms, such as cough and high temperature, will often be all that is necessary to relieve the headache. Fresh air is a valuable factor in its prevention and relief. An ice bag to the head is often of benefit. Many of the headaches accompanying febrile conditions are due to abdominal disorders. Proper elimination is a factor in their prevention and relief. Feeding the patient beyond his digestive ability may cause this trouble in tuberculosis as well as in any other disease.

Probably the two most valuable medicines are codeine and acetylsalicylic acid. In the majority of these cases acetylsalicylic acid will be found to be more valuable in relieving headache, considering its limited unfavorable effects, than any other medicine at our disposal. Where there is any contra-indication to the use of this drug, codeine may be employed. One-fourth grain (0.015 Gm.) of codeine every two or three hours may be prescribed and will usually give relief, or the two drugs may be combined. It should be borne in mind that the treatment of headache in tuberculosis is largely prophylactic.

Pain in the Chest. Frank pleurisy will be discussed under the head of complications. Aside from this condition there is often considerable pain. While this is usually due to some pleural involvement, it may not be of a type that causes a friction rub or that could be classed as pleurisy proper. It may be muscular and due to violent coughing or to prolonged pressure from bed or chair.

Among the measures that may be instituted for relief, the best is rest. This should be of such a character as to lessen the necessity for respiratory movements. Fresh air acts promptly by diminishing the necessary respiratory movements. Intestinal elimination is of advantage, by allowing free movement of the diaphragm.

Local applications such as mustard poultices may give considerable relief. Sometimes strapping is of value.

If the pain is of sufficient severity to interfere seriously with the comfort of the patient, codeine or codeine and acetylsalicylic acid may be used in the same way as recommended for headache.

Pressure Pains. Reference is here particularly to those pains that are felt by so many in the back and lower limbs. These seem to result principally from prolonged pressure on the sacral region. Among the measures that may be instituted for their relief is the proper type of bed, particularly one that has a mattress of sufficient softness and elasticity.

Inducing the patient to rest on the side at intervals may be of considerable benefit. Sometimes it is of advantage to have the patient sit up when his condition might not otherwise call for it.

Mechanical Devices. The water mattress or air mattress, or water or air pads or rings, will often give relief. An old custom that was in use for generations was to place under the patient sheep skins that had been removed from the animals without having the wool clipped. Several of these were placed one on the other, answering the purpose very nearly of an air cushion.

A properly carried out message with some non-irritating preparation may be of value. For this purpose alcohol and witch hazel are frequently employed. In prophylaxis, proper bathing is of particular importance.

Medication is of secondary value and should be employed only to give temporary relief while the other measures are being instituted.

Codeine or codeine and acetylsalicylic acid may be given here as recommended for pain in the preceding paragraphs.

Nervous Phenomena. Under this head will be considered nervousness, restlessness, insomnia, and kindred conditions. These may be the result of one or more of many conditions. The toxemia resulting from the disease is one of the most important factors in the production of such phenomena. Business cares, domestic worries, too much company, violent coughing, pain, indigestion, improper elimination, and many other factors may be at fault.

For prevention or relief, the measures that have already been outlined for other symptoms largely apply here. Complete mental and physical rest is indispensable. This includes a comfortable bed, comfortable clothing, freedom from care and worry, and other favorable factors. Fresh air is of particular importance. An ice bag to the head is a measure that is often neglected and it is certainly a valuable aid.

The value of the bath in the relief of nervous phenomena has been well recognized in the treatment of other diseases. The tendency has been rather to neglect it here. A modified form of massage, particularly of the back, if properly carried out, often produces good results. Faulty elimination is very often the cause of this condition. Proper attention to this detail is both prophylactic and curative.

Imperfect gastric or intestinal digestion is an important etiological factor. Proper attention to this detail constitutes an indispensable part of the treatment. In a case where the patient is not getting sufficient nourishment to meet his requirements, an increase in diet will help the situation.

As simple sedatives, the bromides are probably the most valuable agents. Their toxicity is extremely low and they have absolutely no habit forming quality. Unfortunately their therapeutic value is rather limited, particularly when the symptom is of appreciable severity. They are more sedative than hypnotic and often their main advantage is in lessening the amount of more active medication necessary.

Barbital and luminal may be used. Unfortunately some patients react unfavorably and it is not unusual to see a barbituric acid psychosis resulting from the continued use of these or related drugs. Codeine is sometimes used to advantage as an emergency measure. All of these should be used only for temporary effect and until the symptoms are relieved by the general care previously suggested.

Anorexia. Very often anorexia is an effort on the part of nature to protect the individual, by preventing him from eating more than he is in a position to digest. There may always be special causes and among these is excessive cough, particularly if it is productive, and more particularly if it is associated with nausea. Faulty elimination, insomnia, or anything that interfers with the well-being of the patient may lead to a disinclination to take food. Sometimes the patient merely tires of one particular type of cooking, especially if he has been subjected to forced feeding.

Treatment consists largely in attention to the numerous details of general care and in eliminating pain, excessive cough, insomnia, or other conditions that might be the direct cause of the trouble. Worry, irritability, or an abnormal mental attitude may be a factor. This, of course, should be corrected; in fact the opportunity is often present for the employment of suggestion to advantage.

In many cases merely allowing the patient a period of rest from all food, or at least from forced feeding, will result in the return of appetite. Investigation should be made as to the manner in which the food is served. Sometimes an improvement or even a change in the manner of feeding may help. Many times a complete and radical change of diet is of advantage in improving the appetite or a change of cooks may be all that is necessary. Have some one else prepare the meals for the patient and have her do so without directions from the previous incumbent. In the majority of instances in which I have had patients to leave the city, it has been to secure an improvement in appetite. A few weeks away from home may work wonders in this particular. Not only will they do better when away, but when the home service is resumed, it will offer another change.

Sometimes medication is indicated. Many cases will be found suffering from hypochlorhydria, and may be relieved by hydrochloric acid. A bitter tonic, such as tincture of nux vomica may be tried, or glycerophosphates, elixir of iron, quinine and strychnine, or some other pharmaceutical preparation. If one does not seem to meet the requirements, some other may be tried.

Indigestion. Indigestion seems to be a concomitant part of the disease, and a large percentage of the patients are troubled with it sooner or later. There is a tendency, particularly in certain stages, to hypochlorhydria. Very often violent cough, nausea, worry, or various nervous phenomena may be at fault. These patients are rather prone to constipation which frequently results in faulty digestion. A very common cause of indigestion, probably the most common, is pushing the diet beyond the digestive powers of the patient.

In the treatment of indigestion the first consideration is to adjust the diet so that it does not exceed what the individual can handle with convenience. This requires attention to the character of the food as well as to the quantity. A particular article that is offending may sometimes be discovered and discontinued. The manner of eating and the chewing facilities must be investigated.

The cause of trouble can usually be found with sufficient effort, and intelligent therapy applied. Most of these cases have deficient gastric secretion; hence hydrochloric acid is indicated, sometimes associated with bitter tonics to advantage.

Constipation. One of the common causes of constipation is the toxemia of the disease. The muscular structure of the intestinal tract suffers, of course, with the other tissues of the body, and rest and the recumbent position also lessen intestinal activity. Again, if the patient is sufficiently ill to require the use of the bedpan, this often causes faulty elimination, as many are unable to adapt themselves to its use. In the treatment, habit is an important factor, as it is in the management of constipation from any cause.

Insufficient water is a frequent cause of constipation, and remedying this will often aid in correcting the condition.

In most cases a diet list containing more laxative foods will be of value. This will be found discusses in detail in the chapter on the treatment of constipation. Among the laxative foods are fruits, fruit juices, bran products, oatmeal, Graham products and buttermilk. Olive oil is an ideal laxative for this condition. It is not only a laxative, but a food of much value. As a laxative it is probably best given in one dose at bed time. This may be administered in orange juice or in some other way if more agreeable to the patient. From ½ to 1 fluidounce (15 to 30 cc.) usually meets the requirements.

Cascara is a valuable purgative here and had best be given three times a day. In this way there is less tendency toward discomfort and it also serves as a bitter tonic. The bitter or the aromatic fluidextract may be prescribed in whatever amount is found to be necessary. As a rule a dose of twenty to thirty drops taken three times a day is a safe beginning, and this may be increased or diminished as circumstances demand. As habit, laxative foods, and olive oil meet the requirements, the cascara may be gradually withdrawn. Among the other purgatives sometimes used are liquid petrolatum, phenolphthalein and compound licorice powder.

Simple enemas of plain water or plain water and olive oil may be employed when needed. It is undesirable to use the irritant purgative enema when it can be avoided.

If the patient is not sufficiently ill to be continuously confined to bed, it is desirable to allow him up at least for a while in the morning until the elimination has been regulated.

Diarrhea. Sometimes there is an actual involvement of the intestinal tract as a part of the morbid processes. Fortunately, this is comparatively rare except late in the disease. A very common source of trouble is feeding beyond the digestive ability. Faulty elimination is a fairly frequent cause, the refuse material being allowed to accumulate in the digestive tract until an acute diarrhea results.

Rest is the main factor in treatment and in an ambulatory case it is advisable to order a period of rest in bed. This should always be done if the diarrhea is of much severity.

An immediate investigation of the diet should be made, the first essential being that it be within the digestive ability of the patient. Often the fats are at fault and a reduction of these must be made. All laxative foods should, of course, be reduced or temporarily discontinued.

A warm starch enema may give excellent results. Probably the most satisfactory way of preparing this is to use a pint of cooked starch, prepared just as for laundry purposes, and dilute this with about three pints of warm water, so as to make it sufficiently thin for use. This should be employed as warm as can be comfortably tolerated by the patient.

An initial purgative, particularly of castor oil, or better still castor oil and paregoric, is often of distinct value, and in many cases will be found to be all that is required.

Ginger ale in small quantities, frequently repeated, may be of service if it is palatable to the patient.

Bismuth subnitrate may be given alone in doses of about thirty grains (2 Gm.) or in cases of sufficient severity, or where it fails to meet the requirements, it may be employed with some agent, as paregoric. The treatment here does not materially differ from that of the common diarrhea, p. 485.

Periods of excessive sweating may be a part of many diseased states, though it occurs in tuberculosis with more regularity than in most other conditions.

Rest, both mental and physical, should be carried out as far as possible. Fresh air is a factor of considerable advantage. Attention should be given to the clothing and covering, as in many cases it will be found that the patient, in order to avoid exposure, has overdone protection. Proper bathing is unquestionably a factor in preventing or relieving this condition. The usual warm bath may be followed by a cool sponge or a rub down with witch-hazel or alcohol.

I do not believe that there is any medicine that we are justified in using in the treatment of night sweats. Relief that cannot be obtained by rest, fresh air, proper clothing, bathing, proper diet, elimination, and other measures looking to the general care of the patient, is not to be obtained without paying too high a price.

Complications. Hemorrhage.—This may be present in tuberculosis to a varying extent. There may be only the slightest streak of blood at rare intervals or hemorrhages of such intensity as to cause death in a few moments or any stage between. An effort is being made to standardize the term, "pulmonary hemorrhage," and was discussed under symptoms.

Treatment. Where the hemoptysis only amounts to an occasional tinge in the expectorated material, it need not necessarily be a cause for alarm. It should certainly be regarded as of sufficient importance to require additional care in handling the case, particularly in the demand for rest. The actual extent to which this should be enforced will depend entirely upon the circumstances of the individual case. It is advisable to put the patient to bed until all evidences of blood have entirely disappeared for several days. This may be all the special attention necessary.

Where the blood is large in amount, it calls for the application of more strenuous measures. Among these should be mentioned the following:—

Rest. This should be both mental and physical, and so thoroughly planned as to avoid anything that would raise the blood pressure or increase the respiratory function. It is particularly desirable to have the patient's mind free from anxiety.

Comfort. This is an important factor in the matter of inducing rest, therefore unnecessary cough, pain, insomnia, or anything else that would interfere with comfort should receive attention.

Ice Bag. When the approximate area of bleeding can be located, an ice bag should be applied to that area. When the spot cannot be located, an ice bag may be applied to the upper part of the chest on each side.

Medication. An initial dose of morphine seems to be a measure of almost universal choice. Probably the greatest advantage of this is to secure more perfect mental and physical relaxation. It should be given, of course, by hypodermic injection.

The calcium salts are usually employed. The chloride may be given in solution by mouth in doses of ten to fifteen grains, (0.6 to 1 Gm.), repeated every two to three hours, or may be used intravenously. The preparation that is most commonly given is the lacate, about fifteen grains (1 Gm.) every two or three hours until six or eight doses have been taken. This cannot be given in solution and is usually prescribed in powders. It may be administered in milk or fruit juices. The object in using calcium salts, of course, is to increase the coagulability of the blood should this be delayed through a deficiency of this element. This treatment may at times be of benefit and certainly can do no harm.

Normal horse serum has been extensively employed. It is usually given in doses of 10 to 20 cc., injected subcutaneously and repeated in six to twelve hours if the hemorrhage is not under control. In administering this, the usual precautions should be employed. Many other agents are used and all of them have enthusiastic advocates. The list includes several proprietary preparations.

Transfusion is unquestionably a life-saving measure in many cases. It not only tends to arrest the bleeding, but to repair the damage done.

It is seldom that pulmonary hemorrhages are immediately fatal. The claim has often been made that the patient seems to be better after the average hemorrhage. This is probably due to the increased care that has been instituted.

Pleurisy.—This is sooner or later a complication in a large percentage of cases. It may take the form of either "dry pleurisy" or a "pleurisy with effusion." The treatment of pleurisy here does not differ materially from that described in the chapter on this subject, page 116, but it may not be amiss to review and emphasize some of the more salient points.

In the fibrinous type, (or rather stage), of this condition, rest is a matter of major importance, and much may be done in the early days of the process to limit the serous exudate, or the formation of pus. Every attention should be given to all factors that look to the comfort and well-being of the patient, such as intestinal elimination, proper diet, relief of pain and limitation of cough. If there is a friction rub, the chest should be strapped. Codeine or other agents may be employed, if necessary for the relief of pain.

When effusion has developed, the decision to aspirate will depend, of course, on the amount of the accumulation and as to whether it is increasing, stationary, or diminishing, and the condition of the lung otherwise. A serous effusion may serve very much the same purpose as an artificial pneumothorax. After removal of fluid, it is not unusual to see an accentuation of unfavorable symptoms such as fever, cough, and pain. In order to assist nature in removing this fluid, either before aspiration or after part of it has been removed, the usual measures such as mild hydrogogue elimination, limitation of liquids, limitation of salt and stimulation may be of advantage. These measures are all discussed in detail in the chapter on pleurisy, page 116.

Purulent pleurisy, or empyema, will be found discussed on page 128.

Special Drugs Used in the Treatment of Tuberculosis.—So many medicines have been claimed to be specific for, or of particular benefit in the treatment of tuberculosis, that it may be of advantage to group some of these in a special discussion.

It is hardly possible to give here any new or original suggestions, but only to state a few facts and in some instances a personal opinion. The main object is to tell how these agents may best be administered, if it is desirable to use them at all.

Creosote. One of the chief disadvantages in the use of creosote is that, as often employed, it seems to interfere with both appetite and digestion. This is particularly true of some patients, while others tolerate it well. It is either prescribed alone or administered in conjunction with other remdiees.

When given alone it is probably better to prescribe it in bulk and order it to be administered by drops. The patient should begin with a small dose and gradually increase as his tolerance is established. It should never be taken in milk, as is so often ordered, for the reason that it may interfere with the patient's appetite for this valuable article of diet. It may be given in fruit juices, coffee, olive oil, syrup, honey, or in anything that will dilute its irritating quality provided that the medicine is not in any food material of particular value.

When creosote is prescribed as an ingredient in other medication, it may be ordered with emulsion of cod liver oil, or emulsion of petroleum; or one of several proprietary remedies that contain it may be used. Creosote carbonate, which is frequently used, is a bland liquid and may be taken without inconvenience.

Some prescriptions showing how the drug is often ordered are given in the following:

℞	or	
Creosoti,	f℥iij	90.0
Sig.—Begin with five (5) drops after meals as directed.		
℞	or	
Creosoti,	f℥iij	12.0
Emul. Ol. Morrh. cum Hypophos.,	q.s. oj	480.0
M.		
Sig.—Tablespoonful after meals as directed. (Shake-label.)		

Hypophosphites and Glycerophosphates. In the past these have often been claimed to be more or less specific in the treatment of tuberculosis. The preparations most commonly used are the calcium salt alone, or the calcium salt combined with others, such as potassium, sodium, iron, manganese, quinine, and strychnine. Many claim that the value of these preparations depends largely upon the quinine and strychnine present which act as simple bitter tonics.

Cod Liver Oil. The exact status of cod liver oil in medicine has never been definitely established. It has probably been one of the most largely used agents in the treatment of tuberculosis. It is certainly employed much less in the treatment of tuberculosis than formerly. Its value probably consists largely in its nutrient qualities. It is administered either as the pure cod liver oil or as an emulsion.

There are many so-called tasteless "preparations made from cod livers." It should be understood that these do not contain cod liver oil though previous to the Federal Pure Food and Drug law, practically all manufacturers claimed their products to be preparations of "cod liver oil."

The chief disadvantages of this drug is its nauseous taste. To many persons it is intensely disagreeable, so much so as to put an additional burden upon the patient, and very often in this way interferes with the appetite and digestion. Many patients have lived in constant dread from one dose to the next. Probably the nearest to a palatable preparation is the "egg emulsion." This may also be used as a vehicle for the administration of creosote or other agents. The emulsion is often prescribed with "beef, iron, and wine." When the wine is put in the glass first, and the cod liver oil poured in, the whole may be gulped down with very little insult to the taste.

Calcium. The arguments for the use of calcium in the treatment of tuberculosis are based on two claims:

First. That calcium salts enter largely into the healing processes in many cases;

Second. That sufficient calcium content in the blood is a factor in its coagulating quality; therefore it might lessen the chance of hemorrhage.

The drug is a normal content of foods, as milk, eggs, and green vegetables. It is also a constituent in the hypophosphates and glycerophosphates that are frequently used in the treatment of the disease. It is seldom otherwise employed except for the emergency treatment to arrest hemorrhage.

Cotton Seed Oil. It is a very common custom in some sections of the country for the laity to take this in considerable amounts in treating tuberculosis. One plan is to use the crude oil just as it comes from the press.

Guaiacol. This is used very much as is creosote. It is a constituent in many of the proprietary remedies that have been used.

Atropine. This has been used in the treatment of many of the symptoms, particularly the sweats. I do not believe that it has any place in the treatment of any phase, symptom, or complication of the disease. I remember hearing an old doctor make the remark: "Give your tuberculosis patients atropine—and watch them die." This coincides with my own observations.

Quinine. I do not know of any condition in tuberculosis that would call for the use of quinine. In fact it has been my experience that these patients do not tolerate the drug well. I know that this is contrary to the opinion of some highly competent observers.

Alcohol. The place of alcohol in the treatment of this disease is still unsettled. I do not believe that directly it has any value and, if used to excess, it may be productive of much harm. I have never ordered it in treatment, except as wine and then as a flavor for milkshakes or other food. Since the federal prohibition law, I have discontinued prescribing it entirely and I feel that my patients have not missed any advantage whatever.

It would be impossible to mention all of the other drugs that have been used by mouth, inhalation, and various other ways. Some of these have been discussed under the head of Treatment of Symptoms.

Special Treatments.—From time to time special treatments have been advocated and some of these may be briefly discussed to advantage.

Tuberculin. Following the original work of Koch, the highest hopes were entertained that a specific cure had been found. The medical profession rushed helter skelter into the use of the various preparations of the bacilli, or from the bacilli, and probably did a great deal of damage. Such discouragement was experienced that the pendulum swung far the other way and the use of these preparations was largely discontinued.

The tendency now seems to be more conservative and it is possible that the future may solve the problem. At present the actual value of these preparations in the various types and stages of tuberculosis is still a matter of dispute, but is certainly worthy of continued conservative investigation. There is no doubt but that strong reactions may be productive of harm and the present tendency is to begin with very small doses and gradually to increase them as the tolerance of the patient is ascertained and developed. My own experience with preparations now on the market has been rather discouraging in treating pulmonary tuberculosis. I do not feel that I have anything of value to offer on the subject other than to appeal for extreme care in their therapeutic use when they are used at all.

Climatotherapy. This was discussed in some detail in the early part of this chapter. At one time certain locations were thought to be almost specific in their effect on this disease. The actual value of climatotherapy is still rather uncertain.

Heliotherapy. In some sections of the country this is being extensively employed. It is carried out by exposing the body to the direct rays of the sun. Many excellent treatises are available on the subject.

Summary. My opinion is that the main factor in treatment is patient, untiring attention to detail. This presupposes a most thorough individualization. Medicine if used should be in the smallest amounts and for the shortest time that will meet actual requirements. In the present status of our medical knowledge, we can do little more than treat the patient instead of the disease. If I may be allowed to paraphrase "Holy Writ," I can express my opinion in the following sentence:

"And now abideth rest, fresh air, and nourishment; these three, and the greatest of these is nourishment."

TUBERCULOSIS OF OTHER STRUCTURES

Tubercular Peritonitis.—Tubercular peritonitis is fortunately rare, though possibly it occurs more frequently than is usually suspected.

Treatment is rather discouraging. Rest in bed is essential. The usual measures in the way of supportive treatment, and those looking toward the general well-being of the patient, should, of course, be carried out. Mild intestinal elimination should be maintained, care being taken to avoid violent purgatives. Many special measures have been suggested. Tuberculin possibly has a real advantage in the treatment of these patients. It should be begun with very small doses and gradually increased as the tolerance of the individual is established.

X-ray treatment has been extensively used and is possibly of value in some cases. Aside from the usual measures of sunlight and fresh air, exposure of the abdomen to the direct rays of sunlight has been advocated by many. Surgery has a field of usefulness. The usual treatment consists in merely opening the abdomen, handling the intestines, and closing up. Strange as it may seem, this is followed by marked benefit in many cases.

Tubercular Laryngitis.—This is not to be confused with the transient hoarseness that is so often present in the early stages of the disease. True tubercular laryngitis belongs essentially to the field of laryngology. It is a complication of grave prognostic import. Tuberculin has been extensively employed in its treatment, possibly with benefit. This complication, of course, calls for increased effort in the way of the general care of the patient, as with diet, fresh air, and rest. The special treatment hardly falls within the scope of this text. Nothing of appreciable value seems to have been found.

Tubercular Abscess.—The treatment of this is surgical.

Arthritis.—The treatment of this will be found discussed in the chapter on "Arthritis." Treatment consists principally in the general care of the patient and fixation of the involved joints.

Tuberculosis of the Bone.—This is essentially a surgical condition.

Tubercular Meningitis.—This, fortunately, is a very rare condition. No satisfactory treatment has been suggested. Aside from the measures for the general care of the patient that have been previously outlined, the condition is treated symptomatically. Death seems inevitable in our present knowledge.

ACUTE CORYZA

General Statement. Definition.—The symptom-complex that is designated by the various titles, cold, rhinitis, grip, la grippe, and acute coryza, is a condition resulting from an invasion of the upper respiratory tract by any one of several infectious organisms. Efforts have been made to classify this disease, and several groupings are recognized, one of which is the acute and the chronic. Another classification, and probably one of the most convenient, is that of mild and severe affections. A group known as recurrent colds is also recognized. Also, the area principally affected has much to do with the process in each particular case; that is, as to whether the sinuses of the nose, the throat, the larynx, or the bronchial passages are particularly involved. Almost any part of the body may be affected sooner or later, but the condition is primarily one of the upper part of the respiratory system.

Acute coryza is one of the enormously important factors in life. It is so prevalent that it is hard to estimate the sum total of the inconvenience, suffering, and financial loss that it entails. It has been said that were it not for this group of infections, a large part of the medical profession would have to seek some other means of earning a livlihood. There is very little danger in the condition per se, but the possibility of complications are unlimited, and the process that starts as a "simple cold" may culminate in permanently impaired health or even in death.

Incidence.—The disease is endemic and epidemic. It is highly infectious and apparently may be transmitted in various ways. Some individuals seem subject to repeated colds, and on the slightest exposure may fall a victim to an attack. Others seem almost immune. Acute coryza is always with us but more prevalent in the cooler seasons of the year—fall, winter and spring. External conditions, such as sudden changes in the weather, seem to influence to a marked degree the incidence. At times it assumes epidemic proportions. The great pandemics of acute respiratory infection that have occurred at intervals as far back as medical history reaches are probably modifications of this group, but can best be discussed as a separate entity.

Etiology.—Much doubt still exists as to the actual causative organisms of this disease, or group of diseases, and it is possible that any one of a considerable number may be the factor in a particular case or epidemic.

Among the most common predisposing causes are exposure to cold and dampness, and defects in the upper part of the respiratory tract, as diseased tonsils, chronic sinusitis, and nasal obstructions.

Course and Prognosis.—The degree of severity varies so that it is difficult to even estimate an average course. Coryza, as such, is never a cause of death, but the complications present unlimited possibilities of danger.

Symptoms and Diagnosis.—The symptoms are varied, yet so well known and the diagnosis presents so few difficulties, that extended discussion is hardly indicated. There is usually a history of exposure to infection or of some contributing factor, such as the chilling of the body, sleeping in a draft, or getting the feet wet.

The onset may be rather abrupt with a sense of chilliness, general aching, fever, rhinitis, and cough; or it may be gradual, the condition developing slowly in the course of several days.

Among the most common findings are a sense of chilliness, fever, cough, rhinitis, headache, body pains, a feeling of constriction in the chest, sore throat, and anorexia.

Differential Diagnosis.—The principal diseases that may at times be confused with acute coryza are measles, pneumonia, and dengue. The absence of any eruption, the character of the discomfort, the course of the process, and the character of the chest findings will always lead to a correct diagnosis, though it may at times require a period of observation.

Prophylaxis.—First in importance is the keeping of the body in the best possible state of health. It is still a mooted question as to the possibility of over-care, particularly in the management of children. The claim is often made that the child who is over protected is more subject to colds than the child who is at least partially neglected. In the latter case it is probable that it is the greater amount of living in the outdoors that is of value.

Another unsettled question is the advantage or disadvantage of more or less clothing. These matters are probably not of material importance. It is not unusual to see persons burdened down with heavy clothing constantly subject to colds, or practically immune to them, and the same applies to persons who wear little or less. Mothers often complain bitterly that their girls are risking their lives by wearing so little apparel, but will have to acknowledge that the girls are just as healthy as they were at the same age.

One thing of grave importance is avoiding excessive exposure, such as stepping out of a warm ballroom onto a cold balcony without sufficient wraps; or, as is often seen, children having exercised until their little bodies are wet with perspiration, throwing themselves on the ground to cool off, without any additional protection or covering.

It is still in dispute as to whether the hot bath or the cold bath is of greatest advantage or disadvantage. Matters of this kind such as clothing, exercise, and bathing, are purely personal and to be evaluated in the consideration of the individual case. What will meet the requirements in one will fall far short in another, and very often we can get a history from the patient that will aid us more than all other knowledge available. The individual who takes active exercise can certainly take more liberty in the matter of bathing and clothing than can the one who leads a sedentary life and fails to take sufficient outdoor exercise and recreation.

There are certain measures that will apply to all individuals in their efforts to prevent the acquiring of this infection. One of these is to avoid contact with those already infected, particularly if they are coughing or sneezing. This applies to such cases as sitting directly behind or before them in a closed car, working near them in a closed office, or in any way coming in contact with the material coughed or sneezed out by the person affected. Kissing at times may be a source of infection. Common drinking cups, or improperly cleansed eating utensils may convey the organism, though this as a source of danger is relatively negligible.

To avoid infecting others, the individual should suppress coughing and sneezing as much as possible when in company; should avoid breathing in the face of another; should sleep alone and as far as possible should avoid occupying a closed room with anyone else; should avoid kissing; and should cover the mouth with a handkerchief while coughing.

Vaccines will be discussed later.

Treatment.—This may be divided into abortive, and symptomatic treatment, and the management of complications.

Abortive Treatment.—No definite plan can be given that will apply to all cases. Some seem to be particularly amenable to this type of treatment, while others show no results. It has been my experience year in and year out, that in about 50 per cent of the cases seen early the trouble can be thrown off, or at least the febrile period passed in the course of something like twelve hours, by a modification of the old diaphoretic treatment. The plan is somewhat as follows: These patients are usually seen in the afternoon, but, if seen early in the day, the same measures may be carried out with some necessary changes. For a patient seen at six o'clock in the evening, the following prescription is ordered:

℞		or
Camphoræ Monobrom.,	gr. xv	1|0
Quininæ Hydrobrom.,	gr. xv	1|0
Acidi Acetylsalicyl.,	gr. xxx	2|0

M. ft. cap no. xij
Sig.—Six (6) tonight, six (6) tomorrow.

If the patient is not particularly uncomfortable and the fever is so slight as to be relatively immaterial, he may have a supper of some hot milk soup, such as strained oyster stew. or cream of potato soup. The old custom used to be to have this hot, not only from the standpoint of temperature, but from the use of considerable pepper also. As soon as the capsules are received, the patient is given two; then two more in one hour; and two more in another hour. With the last two capsules, the patient is given a hot mustard foot bath and some hot drink, as lemonade. The mustard in the foot bath is used for its rubefacient action. After an ordinary foot bath there is a tendency for the feet to become chilled, but the mustard will exercise a sufficiently irritant effect to bring the blood to the surface and give a distinct sense of warmth. This bath is best given by the patient sitting in a straight chair, wrapped in a blanket close about the neck and thrown not only about the patient, but around the foot tub. Immediately after the foot bath, the patient is put into a warm bed and warmly covered. If the weather is cold, the room should be sufficiently warm and modified ventilation used. Neither an oil nor a gas stove should ever be used. The patient should not be given purgatives at this time, as it is highly undesirable that he be disturbed during the night. If the patient is very restless or suffering, codeine in sufficient amount may be employed. One of the important results of this treatment is profuse perspiration. If it should be necessary to change the patient's clothing, it should only be done in a warm, closed room, with every precaution against chilling. An electric pad, or a hot water bottle is of considerable advantage. In the morning the patient may be given a purgative of castor oil or a seidlitz powder and the capsules continued, one about every three hours. If the weather is unfavorable, these patients, no matter what their condition, should remain indoors the entire day, with a light diet consisting largely of cold fruit drinks and hot milk drinks. Some will be entirely relieved after the first night's treatment. A majority will be markedly benefitted. The balance of the treatment will consist in symptomatic relief of any cough, rhinitis, etc., and will be discussed separately. One disadvantage of the prescription just given is that it sometimes tends to produce nausea. If the patient is already nauseated, or if there be any reason why this prescription should not be given, the following may be substituted:

℞		or	
Codeinæ Sulphatis,	gr. ij		13
Acidi Acetylsalicyl.,	gr. l	3	30
Bism. Subnit.,	gr. ccc	20	00

M. ft. cht. no. x.
Sig.—Three (3) tonight, then one every four hours.

Another measure for aborting the infection, that is frequently employed with apparent success, is to give large doses of alkalies. About 60 grains (4 Gm.) of sodium bicarbonate is given every hour for five or six hours. The citrates are sometimes used, or these two combined.

Ambulatory Cases. Where the attack is not severe and for any reason the patient is unwilling to quit work and go to bed, either of the prescriptions may be employed, it being probably best to give a capsule or powder every two hours until relieved, and then one every four hours. Such measures may be instituted for protection against exposure and care as to diet as are found expedient.

Symptomatic Treatment.—A fairly large percentage of cases, particularly in some epidemics, present special symptoms or complications, such as severe pain, violent and persistent cough, or marked rhinitis. These may be handled somewhat as follows:

Pain. The principal complaint is headache and a sense of "aching all over," the latter is often particularly referred to the back. The prescriptions as previously given will usually meet the requirements. A preliminary dose of ½ grain (0.03 Gm.) of codeine may sometimes be used to advantage. In some cases it is advisable to prescribe a few ¼ grain (0.015 Gm.) codeine tablets, one to be given with each dose of the other medicine until sufficient relief has been obtained, or the codeine may be included in the prescription.

Cough. During the period of intensive treatment, the regular measures, as previously outlined, will usually be all that is required to control the cough. Where the cough is of marked violence, codeine may be used just as recommended for pain. After the period of intensive treatment, if sufficient cough remains to require special medication, the following prescription has been found to be of value:

℞		or
Ammonii Bromidi,	ʒj	4.0
Sodii Citratis,	℥j	30.0
Syr. Tolu,	f℥j	30.0
Liq. Potas. Citratis,	q.s. f℥vj	180.0
M.		

Sig.—Tablespoonful in water every two to four hours.

After the stage of acute cough, with expectoration, has passed, there is sometimes a nonproductive cough which may be an annoying factor for a considerable time. The terpin hydrate preparations are excellent for this, or something like the following may be ordered:

℞		or
Ammonii Brom.,	ʒiiss	10.0
Spir. Chloroformi,	fʒiv	15.0
Tinct. Opii Camph.,	fʒvj	22.0
Syr. Tolu,	q.s. f℥iv	120.0
M.		

Sig.—Teaspoonful every two to six hours.

Sometimes in the treatment of these coughs, sprays and inhalations are of value. These may be employed as suggested for rhinitis. In some cases, particularly during the early, acute stages, local applications are unquestionably of value. Among these, probably the one that gives the greatest relief is a mustard poultice, prepared by using one tablespoonful of mustard, eight tablespoonfuls of flour, the white of one egg, and water sufficient to make a paste. This is spread upon a thick cloth and covered with muslin or cheese cloth. The poultice should be of sufficient size to cover the entire front of the chest and left on until redness has been produced, usually about fifteen to thirty minutes. The same poultice is then put on the back of the chest for the same length of time. Following this application, the chest should be thoroughly cleansed and cold cream applied. In the case of a woman, as it is inadvisable to apply this over the breasts, it is best to use two poultices, one large enough to cover the front of the chest above the breasts, and one covering the region between, the two plasters making a "T." These when applied to the back of the chest should be in the form of an inverted "T," one below the scapulæ and one between.

Another application that is often employed, and which probably exercises its chief value by being placed where the vapors are inhaled, may be ordered as follows:

℞

		or
Ol. Terebinthinæ,	f℥j	30.0
Spir. Camphoræ,	f℥j	30.0
Ol. Olivæ,	q.s. f℥iv	120.0

M.
Sig.—(Shake label.) Apply on flannel as directed.

This is used to moisten a flannel chest protector, which may be purchased at a drug store, or made for the occasion. It should be remoistened every six to twelve hours. A common practice of some physicians is to spread a blanket over the head of the bed and spray it with turpentine. A patient will frequently wish to employ some one of the proprietary remedies that are prepared for local use. These depend for their value largely on camphor, menthol, and other aromatic content. There is no objection to their use and they may be of some benefit.

Rhinitis. A rather interesting feature in regard to this condition is its marked tendency to appear in some epidemics and its relative infrequency in others. The special measures that have been instituted for relief have been rather discouraging in their results. In fact, many have almost reached that point where they feel that the old adage "The less you do, the better they are," may have a foundation in fact. Among those things which are employed to relieve are the following:

℞

		or
Cocainæ Hydroch.,	gr. v	.3
Antipyrinæ,	gr. xv	1.0
Aquæ Dest.,	q.s. f℥j	30.0

M.
Sig.—For physician's use.

This is applied by molding a piece of cotton on an applicator, removing the cotton and dipping it in the solution and inserting it in the nares. Several of these are successively introduced, left in a few minutes, then removed.

The following sprays are sometimes used:

℞

		or
Adrenalin Chlor. (1:1,000),	fʒiss	6.0
Liq. Antiseptici,	fʒiij	12.0
Aquæ,	q.s. f℥iij	90.0

M.
Sig.—Use in atomizer as directed.

℞

		or	
Camphoræ,	gr. iv		25
Eucalyptolis,			
Ol. Pini Pum.,			
Ol. Menth. Pip.,	āā gtt. iv		25
Petrolati Liq.,	q.s. f℥iv	120	00

M.

Sig.—Use in nebulizer as directed.

These are usually employed by thoroughly spraying the nose with the adrenalin solution and following it with the oil spray. The patient should hold his breath while using the first solution and breathe deeply while the second is being employed. The oil spray is best used in a regulation oil atomizer that will throw it out in the form of a cloud instead of droplets.

The following inhalation may also be of value:

℞

		or	
Mentholis,	ʒj	4	0
Camphoræ,	ʒj	4	0
Tinct. Benz. Co.,	q.s. f℥ij	60	0

M.

Sig.—Use a teaspoonful to a pitcher of hot water as an inhalation.

Where the condition is sufficiently troublesome, the best results are probably obtained by using these remedies in the following order:

First. The adrenalin spray.

Second. The inhalation.

Third. The oil spray.

Irrigation of the nasal passages with normal salt solution seems to give relief to some. At times touching the terbinate bodies with a ten percent solution of silver nitrate is of benefit. Sprays or applications of a solution of argyrol are also employed.

Convalescence.—Those cases which subside promptly under treatment need not be considered here, but those which run into days and weeks must be handled with patient care. If the attack has been severe, cardiac damage is always a possibility. If there is a tendency to continued fever or persistent cough, the possibility must be considered of bronchitis, pneumonia, tuberculosis, or some other condition being present, either as a complication or as the underlying factor. The management of the convalescent will depend entirely upon the individual case and general rules will seldom apply. An easily digested and nourishing diet, continued protection from exposure, gradually increased exercise, outdoor fresh air and sunshine, are all of value.

Vaccines. In some cases vaccines seem to be of advantage. The value of these in the treatment of coryza is still a disputed question. In prophylaxis we find some who are enthusiastically in their favor, while others claim that they have no place in legitimate medicine. It is possible that in some cases they may be of value, while in others they have no benefit. During the treatment of the acute stage, they are not indicated. As an aid in finally clearing up the persistant case, either the autogenous or the stock vaccines seem at times to be of benefit. If properly employed, they certainly do no harm and they may have a field of usefulness that would justify their being used in selected cases.

Complications. Otitis Media.—One of the principal considerations is an early diagnosis and one of the most important parts of a physician's equipment for handling acute respiratory infections, particularly in children, is a head mirror and an ear speculum. Repeated examinations should be made, particularly when the epidemic is characterized by a large percentage of this complication. In some epidemics the condition is mild, while in others it seems to run a more serious course and requires closer observation and more frequent recourse to radical measures. All cases that do not respond readily to treatment are distinctly within the province of an ear specialist, but the regular medical attendant at least should be qualified to make an early diagnosis and know when to call in expect assistance. Among the measures that are employed, are the following:

For the relief of pain, the following prescription is frequently used, and it also is of value for the relief of inflammation of the drum or any part of the external ear that may be involved:

℞		or	
Atropinæ Sulph.,	gr. ⅕		01
Cocainæ Hydroch.,	gr. iij		20
Phenolis Liq.,	ℳx		60
Glycerini,	q.s. f℥ss	15	00

M.
Sig.—Use in ear as directed.

This may be used every hour or two until relief from pain has been obtained and then the intervals between applications increased. One of the most important factors in the proper application of this remedy is to have it reach the drum. To insure this the patient should lie with the diseased side up. The ear is pulled out and forward in such a way as to open the canal as much as possible, and several drops are put in so that the solution will be sure to reach the deeper part of the external ear and not lodge along the walls. The patient should remain in that position for about five minutes, and then a plug of cotton is loosely inserted between the tragus and antitragus, and the ear turned down for several minutes so that any excess of the solution may drain out. It must be remembered that the ear while being treated should be under frequent observation, for, while this may relieve the pain, a destructive process may be going on in the internal ear without giving evidence. Another measure for the relief of pain and the prevention of damage is keeping the eustachian tube open. This may often be effected by the treatment suggested under "Rhinitis," in the preceding section. Sometimes the pain is of such intensity that the administration of codeine or acetylsalicylic acid may be necessary. When this ear condition develops during the stage of intensive treatment, the question arises as to the advisability of continuing the use of quinine or even of acetylsalicylic acid. It has been suggested that they tend to cause congestion in the ear and favor the accumulation of pus. On the other hand, it has been contended that the drugs in question favor relief by this very action, very much as counter irritants may be of advantage in other areas. There comes a time in many cases when opening the drum is necessary for the relief of pain, for the prevention of more serious damage, and to effect a cure. If the attending physician is not qualified to do this, he should not delay in seeking expert assistance. The details of this procedure hardly belong here.

Sinusitis.—The chief consideration here is to secure continued drainage and ventilation. This is best secured by energetic use of the measures outlined under rhinitis. The relief of pain is best effected by the use of codeine and acetylsalicylic acid. In handling coryza, sinusitis should always be considered as a possibility, and careful and repeated investigations made to detect it promptly should it develop. Every physician doing internal medicine should be more or less skilled in the use of the head mirror, nasal and ear speculæ, and the transilluminator. Inquiries should always be made as to the localization of pain that would indicate complications and very often percussion over the area involved will give the evidence necessary to make a diagnosis. Where the conditions do not promptly respond to treatment, expert assistance should be sought and surgery resorted to if necessary.

Bronchitis.—There is a certain amount of bronchitis in the majority of acute respiratory infections. Fortunately, this usually subsides along with the passing of other acute symptoms. In a fairly large percentage of cases, it may be the dominant factor of the disease. In others there is a tendency for a more or less chronic process to persist. Usually the measures outlined under the treatment of cough will meet all the requirements. The subject of bronchitis has been treated in a special article.

Pneumonia.—This is discussed in detail in a separate article. The only point necessary to be emphasized here, is that pneumonia is always a possibility in these infections, and, while a preliminary examination of the chest should always be made, if the disease does not promptly subside repeated examinations should be instituted so as to detect the condition promptly should it develop. It is well on assuming treatment of what seems to be a case of common cold to bear in mind that pneumonia is a possibility, and must be considered, not only in outlining the treatment, but in giving a prognosis. The old maxim of Jenner applies here; "It is not looking, instead of not knowing, that causes trouble." If pneumonia be suspected, or if it appears, such remedies as acetylsalicylic acid should be discontinued and the case treated as pneumonia.

Tuberculosis.—It is highly probable that repeated acute colds or chronic involvements may render the patient subject to tuberculous infection, or may convert a passive tuberculous infection into an active tuberculous disease. It is necessary to bear this possibility in mind in handling patients subject to frequent colds and to give them the benefit of frequent and careful investigations.

EPIDEMIC INFLUENZA

General Statement. Definition.—This is an acute, highly infectious disease affecting principally the respiratory apparatus. It usually appears in epidemics or pandemics, though at times sporadic cases are found.

Influenza epidemics have appeared at those times when simple acute respiratory affections are most common, and, while the epidemic taken as a whole can be differentiated, it is often extremely difficult in individual cases. Therefore, it is highly probable that a great many of the cases classed as epidemic influenza are common colds. This will probably account for much of the great variation in the statistics of the many observers, and also in the failure of some to find the uniformity in the course of the disease that is reported by others. For example, this may account for many of the so-called abortive cases and explain many of the "specific" treatments.

The word influenza is rather confusing, as it is a term used by many as synonymous with la grippe, in reference to any of the several types of epidemic colds.

Effort has been made to classify influenza according to its special manifestations in individual patients, for instance as pulmonary, gastric, intestinal, nervous, etc. This is rather an unsatisfactory plan, due to the fact that in most cases there is evidence of the invasion of many parts of the body and very often the symptomatic evidence as to predominating area of involvement varies from day to day.

Incidence.—Almost as far back as medical history goes, there are records of pandemics of diseases that, in all probability, were at least closely related to the condition under discussion. There is considerable difference in the manifestations of the disease in the different epidemics that those in this generation have had the opportunity to observe, and allowance for such variations must be made in evaluating the history of previous times. There has been particularly a difference in the severity of the epidemics that have swept the country in the last series since the pandemic of 1918. The mortality has varied markedly and there has been a greater tendency in some epidemics to the involvement of certain structures, though, as a whole, there was always sufficient uniform evidence to enable one to identify the condition beyond question as being the same process in each of the several epidemics. The disease is more prevalent in the fall, winter and spring, just as other acute respiratory infections. Any type or condition of humanity may be affected.

Etiology.—There is so much uncertainty as to causative organism that a discussion here is hardly worth while.

It is probable that epidemic influenza is transmitted in the same way as other acute respiratory infections.

Course and Prognosis.—This varies not only in different epidemics, but at different times during the same epidemic. About a week of fever is probably a fair average. Some of the cases may persist with more or less temperature for many days longer, or even for weeks without presenting evidences of complications. Many show intermissions or remissions. Relapses are not uncommon.

The mortality varies, depending largely upon the section of the country, the season of the year, etc. There has been marked differences in this respect in the several epidemics.

Death usually results only from such complications as pneumonia, myocardial damage and encephalitis.

Symptoms and Diagnosis.—In the discussion of the symptoms and diagnosis of a disease as protean in its manifestations as the one under consideration, it is hard to do more than mention some of the most important evidences that would be of particular value.

History of Exposure. This, of course, is of primary importance in making an early diagnosis. During the course of an epidemic suspicions are immediately aroused by clinical evidences that otherwise might escape notice.

Onset. In the majority of cases this is rather abrupt, and from the first evidence of disability until the time the patient is following a typical course of the disease may be only a few hours. In other cases there may be a prodromal period of general discomfort lasting any where from a few hours to one or two days.

Pain. This is one of the characteristic symptoms and is rarely absent. In many cases it is marked. There may be general pain, described as aching all over. The expression "Every bone in my body aches" is fairly common. Often the complaint is especially of the back, while in other cases the joints are the site of marked discomfort. There is often a sense of discomfort in the chest which is described as a sense of oppression or constriction. Headache is the most uniform complaint, and although it is sometimes rather transient in character, it is often markedly persistent. There is not much tendency to a localization as is found in dengue, rather a more general head pain, though many complain of an accentuation of the discomfort, particularly in the forehead.

Fever. There is naturally the widest possible range in the temperature reaction of various cases. As previously suggested, the period of fever probably averages in uncomplicated cases about one week, followed in most instances by lysis, though crisis is by no means unusual. In many instances the fever falls to near normal or even to normal, only to rise again in the course of a few hours and continue an irregular course. There is a decided tendency towards the close of the disease toward remissions of temperature or even intermissions.

The patient often congratulates himself that the trouble is all over, only to find that in a few hours or the next day he again has fever. In uncomplicated cases the temperature usually ranges from about 101 to 103 for two or three days and then gradually falls. Very high or persistently high temperature should always arouse the suspicion that a complication is present.

Cough. Cough is practically always present, though in some cases it is more pronounced than in others. It may be very distressing both because of its violence and its persistency. Sometimes there is no appreciable cough for the first day or two of the disease. The cough is at first non-productive; later on there is usually considerable expectoration.

Sore Throat. One of the earliest complaints is sore throat; in many cases it is rather mild and the patient will not mention it unless definitely asked. There is seldom any marked involvement except in complicated cases. Upon examination there is usually little evidence except a general redness, more particularly of the anterior pillars.

Laryngitis. This is sometimes quite marked, when careful examination and cultures are indicated. Particularly in some epidemics many cases will be found that will cause much anxiety from the standpoint of possible laryngeal diphtheria. Frequently, particularly in adults, the laryngitis may be distressing in the extreme. In the 1923 epidemic I had two cases, both middle aged women, where they and their families, thought that the patients were dying from suffocation. This developed early in the course of the disease.

Bronchitis. The usual evidences of bronchitis are among the most consistent symptoms.

Chilliness. The disease is sometimes ushered in by a distinct chill; in the majority of instances, there is rather a sense of chilliness that persists for several hours and may last for a day or two.

Prostration. This is fairly constant; it may develop early, and it has a tendency to be out of proportion to the apparent severity of the disease. It is one of the most persistent of the manifestations, often lasting for weeks or even months after the patient is otherwise well.

Nausea. There is a marked tendency to nausea, more evident in some of the epidemics than in others. In many instances there is only a dull sense of discomfort; in others there may be persistent vomiting lasting for several days. It is not unusual for the patient to attribute it to some particular medicine or food. The symptom is not very amenable to treatment.

Coryza. In most cases the evidences of coryza are not very pronounced; in some, the condition may be rather distressing. There is not so much a tendency to sneezing as there is to an interference with normal respiration and a feeling of general discomfort. This is usually a self-limited process and is among the first of the discomforts to begin to subside.

Nervous Phenomena. There is a marked tendency to nervous phenomena and in some cases it constitutes the most distressing manifestations of the disease. It is evidenced particularly by extreme restlessness and an inability to lie still or to be comfortable in any position. It is extremely resistant to treatment. I was a victim of the disease in 1922 and I remember this symptom as being more trying than all of the other discomforts combined. In many cases there is active delirium and there is a decided tendency to mental wanderings at night, particularly in the case of children.

Insomnia. While this is not a symptom of maximum importance, it is of sufficient frequency to merit discussion. In many instances there is a more or less complete inability to sleep that may persist for several nights. In other cases, there is a tendency to a troubled and unsatisfactory sleep that interferes with the well-being of the patient. Children particularly may be affected by bad dreams and are prone to cry out during the night. This matter of night terrors is so pronounced, that the little folk dread the approach of darkness.

Abdominal Tenderness. While distinct pain is rather unusual, a certain amount of abdominal tenderness on pressure is the rule.

Bloody Expectoration. Expectoration of blood in the course of an acute respiratory disease naturally arouses suspicions of pneumonia, but in this disease there are a great many cases which show bloody expectoration, in which pneumonia can be absolutely excluded.

Nose Bleed. This occurs in many cases; it is seldom of sufficient extent to cause much inconvenience. It is rather apt to develop early in the disease.

Slow Pulse. This is one of the most characteristic findings in establishing a diagnosis between epidemic influenza and common respiratory infections. It is also particularly marked in the influenzal pneumonia.

Slow Respiration. Even in uncomplicated cases, there is a tendency for the respiration rate to be below what would be expected from the temperature. In those cases that develop pneumonia, the same tendency persists. It is not unusual to see a case with evident pulmonary involvement with a temperature of 104 and respiration little above 20. Later in pneumonia both the respiration and the pules increase in frequency.

Sweating. A tendency to sweat would naturally be expected in a disease causing as much prostration as the one under discussion. While many cases do not show any appreciable perspiration, in some instances it is pronounced.

Anorexia. There is usually an almost complete loss of appetite, but many cases are encountered in which there seems to be an abnormal desire for food. It has seemed to me that in these cases the desire has been for rather unusual dishes. I remember particularly two little patients, one of whom spent much of her time crying for cod fish balls, while the other was ready to promise anything for a big dish of steamboat hash. They seemed to have little desire for anything else.

Cyanosis. In uncomplicated cases there does not seem to be so much a tendency to cyanosis as there is to a rather congested, reddish appearance of the skin, especially of the face. In the pneumonia of this disease, cyanosis is particularly pronounced. The degree of this seems to have some prognostic importance, as the cases showing the symptom to a marked extent or showing it early, justify a more unfavorable prognosis.

Laboratory Findings.—One of the valuable diagnostic points, particularly in differentiating this disease from other acute respiratory infection, is the absence of leukocytosis. The total white count may be even below normal, and an increase to above normal should cause a doubt to be entertained as to the disease being uncomplicated epidemic influenza. There is also a tendency for the neutrophile percentage to be lowered in uncomplicated cases. There is nothing characteristic in the urine findings, although there are frequently traces of albumen and other evidences such as may be present in any acute febrile disease.

Physical Examination.—It is hardly within the scope of this article to go into details as to the physical findings. It may be stated here, however, that there is a tendency for these patients to look distinctly sick and though there is nothing in the general appearance that is definitely characteristic, the extreme prostration is often evident. There is a tendency to a suffusion of the face and in cases with only ordinary involvement, there may be distinct cyanosis. The most characteristic evidence obtainable is the peculiar findings in the bases of one or of both lungs. This is not present in all cases, nor even in the majority, but there is not found in any other condition the same peculiar shower of crepitant rales that is often heard in a typical case of epidemic influenza. While it may be at the base of both lungs, it is usually unilateral or at least more marked on one side. This finding may be persistent, sometimes lasting for days after the case is otherwise clinically well. It is this type of case that gives most of the pneumonias. In the area of involvement there is also impairment of the percussion note and the respiratory sounds. There are, of course, many other findings upon a physical examination, but they are not distinctly characteristic and will not be discussed here.

Differential Diagnosis.—In individual cases it is often very difficult to make a positive diagnosis of the epidemic type early in the disease. The unfortunate tendency on the part of the profession during the course of an epidemic is to take it for granted that all cases are of the epidemic disease and to fail to make sufficient investigation. We should avail ourselves of all obtainable data in every instance and not be satisfied until either by definite findings or by elimination we have been able to establish a positive diagnosis. It is certainly desirable in the course of an epidemic to treat all cases of this type as influenza while further evidence is being obtained. The main difficulty is in differentiating influenza and influenzal pneumonia from common colds and common pneumonia. The influenzal group shows a decided tendency to slow pulse, slow respiration, low blood pressure, low total white and low neutrophile blood counts. The other group tends to rapid pulse and respiration, increased pressure (till late), and high total white and neutrophile counts. Influenza carries more prostration and cyanosis and a larger tendency to hemoptysis. If there were no other differential points, there are enough cases in an epidemic showing the peculiar shower of crepitant rales at the base of a lung, to identify this disease.

Prophylaxis.—In the course of an epidemic, the tendency is to rather take it for granted that everybody will have the disease in an infected household and, therefore, to make no effort at isolation. No matter how general the condition may be, there is always a chance of lessoning the spread among the uninfected. In a disease of as serious a nature as the one under discussion, it is particularly desirable to use every means at our dosposal to protect others. Most of this will be discussed under the head of treatment. The closing of schools and other meeting places during the progress of an epidemic depends entirely upon the peculiar conditions in each instance. It is certainly desirable in schools to exclude all children showing evidences of respiratory infection, and not to readmit patients until sufficient time has elapsed. The value of masks, sprays, gargles and measures of this type has not been definitely decided, but they probably have no field of usefulness. Sprays and gargles may do more harm than good. The prophylactic value of vaccines is still uncertain. My personal opinion is that while their efficiency is not by any means one hundred percent, that they are distinctly valuable. My experience has been confined exclusively to the use of the mixed polyvalent stock vaccines, and while the series of cases under my personal observation has not been sufficiently large to be of much statistical value, I gathered the impression that they lessen the tendency to acquire the infection and the chances of complications. I believe that the plan of giving only two, three or four injections probably has less value than where the injections are continued throughout the course of the epidemic. During the winter of 1918–19, when we had two extensive epidemics in New Orleans, I had a group of patients who received this vaccine throughout both of the epidemics, at first frequently, then about one dose a week. Few of this group developed the disease and none had pneumonia. I believe that there is much yet to be learned in this particular field, and that the matter is worthy of further investigation.

Treatment.—There is no specific treatment, nor is there any one particular method that can be claimed to have a definite advantage over all others. The treatment may be considered under three heads. The protection of others, contributing to the comfort and well-being of the patient and the prevention of complications.

In this disease, particularly, success is the result of infinite care and attention to details. This is particularly difficult during epidemics, and the tendency is for the physician to allow himself to do only the apparently necessary work, to subject all patients to more or less of a routine and to leave much to Providence.

General Care. Insolation. As the disease is highly infectious and fraught with much inconvenience and a large element of danger, it is certainly desirable to use every possible effort to eliminate the chances of infecting others. Quarters should be selected for treatment that will admit of as complete isolation as possible, that is if there are others in the house who have not recently had the infection. The nurse or members of the family who have charge of the case should avoid contact with others, and should they develop symptoms that are suggestive of the disease, they should be isolated promptly.

Room. In selecting treatment quarters, the possibility of pneumonia should be borne in mind; therefore, one must be guided by those factors that would influence if the patient actually had pneumonia at the time. This would include the consideration of isolation, lighting, ventilation, the possibilities of heating and convenience in handling the patient. An open fireplace is always desirable, as it lends itself to proper heating, markedly increases the ventilation, and facilitates the disposal of infected material. Another point of major importance in the selection of the room is to have one that will be as free from noise as possible. Where the house is on a paved street that carries much traffic, it is better to select a back room.

Rest and Quiet. This is of major importance and prompt measures to insure rest and quiet should be instituted from the beginning. As suggested in the preceding paragraph, the room should be selected with the idea in view of having the minimum of noise. The patient should be put to bed and confined in bed until several days after the temperature has reached a permanent normal. The actual duration of the rest must, of course, depend on the general condition of the patient, on the severity of the disease, the amount of evident prostration, etc. Where there is any possible doubt, it is certainly better to err on the side of safety and prolong the period of rest. When the time comes to allow the patient to get up, extremely conservative methods should obtain. He may be allowed to sit up for a short while the first day, and this gradually increased as his reaction indicates.

Ventilation. The amount of ventilation should depend on such factors as the condition of the patient and the temperature of the outside air. In other words, one should individualize and not try to follow a hard and fast rule. It would seem logical to suppose that a disease that is characterized by a rather slow respiration, or at least during that period of the disease when the respiration is slow, that there is not that large necessity for unlimited ventilation as is the case in ordinary lobar pneumonia. While the cyanosis is in all probability largely a circulatory matter, at the same time it should influence in the matter of ventilation. Ideal conditions in cold weather would be to have a corner room with the bed placed between the windows; to have a grate fire burning even if there be a heating system in the house; to keep the room at a temperature of about 65 or 70, and to allow as much air as can be admitted without exposing the patient to cold drafts. By the use of screens, this matter of ventilation and protection can often be easily arranged, or when necessary, the nurse should be instructed to close one of the windows. The unmodified fresh air treatment in cold weather for either the ordinary influenza or the pneumonia of the disease does not seem advisable. This was rather substantiated by the mortality among soldiers during the World War.

Nursing. Where trained nurses are not obtainable and it is necessary to rely on members of the household, certain ones should be designated for the care of the case. It is best to have someone in constant attendance to prevent the patients from exposing themselves or getting up. This should be rigidly enforced from the very beginning of treatment. Many of these cases show marked nervous phenomena and have to be handled with a great deal of diplomacy.

Baths. A daily warm sponge should be given during which the room should be closed and sufficiently warm to avoid chilling. Hydrotherapy beyond this is not often, if ever, indicated.

Ice bags. A properly filled ice bag should be used to the head when indicated, either by nervous phenomena or high temperature or both. There is no fixed rule here any more than in other diseases, and the same general considerations obtain.

Hot Applications. During the period of chilliness which ushers in the disease and may last throughout its course, hot water bottles or an electric pad may contribute much to the comfort of the patient.

Frequent Examinations. Too much emphasis cannot be laid upon the advantage of this phase of care, particularly when there is high temperature, and more particularly if these is a tendency to persistently high temperature, bloody expectoration or any other indication that might point to complications. In the cases of young children, the throat and ears should be examined every day with a head mirror and proper light. With older patients, investigation should be made into all complaints and any clues followed up, such as sore throat or ear discomfort. The chest should be examined, front, sides and back, and the abdomen palpated on every visit. This will require only a few minutes and will result in the saving of many lives. It seems quite unnecessary even to suggest these measures, yet any one who had an opportunity to observe the work that was done in the rush of the recent epidemics will understand that there are grounds for emphasizing the foregoing plea.

Diet.—The stormy period of the disease is so brief, that there is little necessity for a high caloric intake. The statement is often made that patients must be highly nourished so that they will have sufficient strength to meet complications. Should pneumonia or circulatory failure develop, it may be better to have a patient who is slightly undernourished than one handicapped with a quantity of undigested food. In the matter of diet, it is necessary to individualize. Such factors must be taken into consideration as the general state of nutrition of the patient, and one may disregard feeding more in a patient who is already full-weight than in one who entered the disease already in a low state of nutrition. The digestive history, the demonstrated ability to handle food, the height of the temperature, and many other factors must be considered. Unless there be some reasons to the contrary, the following diet may be tried:

Water, carbonated drinks, such as ginger ale and root beer, fruit juices, tea and coffee, strained soups and broths, buttermilk, malted milk and similar preparations and toast. It is probably inadvisable to allow a full diet for several weeks, as it is very common to have these patients, many days after convalescence has been established, suffer from acute digestive disturbances, sometimes of a rather violent nature. During the recent epidemics it was not unusual to see trouble from dietary indescretions that were so mild that in the course of most other diseases, they probably would have caused no inconvenience.

Routine Medication.—It is rather unsafe to recommend a routine treatment in any disease in which there is no specific, and in giving a routine here it should be understood that it is only to be considered in a general way, and not arbitrarily applied to all cases as individualization is the keynote to success. When the patient is first taken sick a prescription somewhat as follows may be tried:

℞		or
Camphoræ Monobrom.,	gr. xv	1|0
Quininæ Hydrobrom.,	gr. xv	1|0
Acidi Acetylsalicyl.,	gr. xxx	2|0

M. ft. cap. no. xij
Sig.—One every two to six hours.

These capsules are given every two hours until the patient is more comfortable and then the intervals gradually increased. If the patient is seen in the afternoon, good results often seem to follow the giving of about six capsules in the course of a few hours. These may be administered two at a time and the last arranged so that they will be taken at the usual bedtime. This dosage will often cause considerable sweating, and instructions should be given that will prevent the patients getting chilled by exposure. If there is much nausea, or intolerance of the capsules or a tendency to loose bowels, the following prescription may be employed instead:

℞		or
Barbitali,	gr. x	|6
Acidi Acetylsal.,	gr. xxx	2|0
Bism. Subnit.,	gr. cl	10|0

M. ft. cht. no. vj
Sig.—One every two to four hours till relieved.

This is given every two hours until the patient is more comfortable, then the intervals increased. Under no circumstances should the patient be awakened for medicine. In the case of children too young for capsules, the following prescription would apply:

For a child 6 years old

℞		or
Camphoræ Monobrom.,	gr. x	|6
Acidi Acetylsalicyl.,	gr. xx	1|3
Bism. Subnitratis,	gr. c	6|5

M. ft. cht. no. x
Sig.—One every two to four hours till relieved.

This may be given in orange juice or in any way that is most palatable.

If there is any evidence of pneumonia, this treatment should be immediately stopped, and no acetylsalicylic acid or depressant of any kind given. In any event as soon as the fever and discomfort have sufficiently subsided, the above prescriptions are immediately or gradually discontinued and the following begun:

℞		or
Sodii Citratis,	℥j	30 0
Syr. Tolu.,	f℥j	30 0
Liq. Potas. Citratis	q.s. f℥vj	180 0

M.
Sig.—Tablespoonful well diluted every two to four hours.

This may be administered in water, fruit juices or carbonated drinks.

This usually is the last of the routine medication. The changes necessary in the presence of excessive cough, nausea, etc., will be discussed under symptomatic treatment.

Laxatives. It is the custom of many to give a purgative when the patient is first seen. The following considerations are worthy of note. After the chilliness with which the disease is ushered in, and particularly if the preceding treatment has been carried out, there is a tendency to sweating and exposure might be very unfortunate. Also it is highly desirable that the patient have rest and sleep particularly during the first night of the disease when the discomfort is often so pronounced. None of these factors are conserved by an initial purgative, which to the contrary is prone to disturb repeatedly through the night and not only to disturb, but to subject to exposure at the very time when it is fraught with most inconvenience and danger. It is best to delay giving the purgative until the following morning when if there is not sufficient elimination, a laxative such as a Seidlitz powder, milk of magnesia or castor oil may be given. The dose should be such as to produce the necessary laxative effect without violent purging. After this, intestinal elimination will be sufficiently maintained in most instances by the use of liquid petrolatum at night. If this does not meet the requirements, some other laxative or an enema may be employed.

Symptomatic Treatment.—It is hardly practicable to try to cover the treatment of every possible condition that may arise in the course a large series of cases; an effort will be made to discuss only some of the most important.

Pain. This may be sub-divided into headache and general body pains.

Headache. At times this is severe. It is one of the earliest symptoms and may persist for days. The general management suggested in the preceding paragraphs will usually be all that is required, that is rest, quiet, proper elimination, sometimes an ice-bag, and the acetylsalcylic acid that is part of the routine treatment. Where anything else is needed, probably the best agent is codeine. It may be given in ¼ grain (0.015 Gm.) doses by mouth with the other medication every two to four hours, until the symptom has been sufficiently relieved.

Body Pains. The measures as previously suggested will meet the requirements in a large majority of cases; that is, rest, quiet, comfortable bed, proper covering, hot water bottles or an electric pad when necessary, and the acetylsalcylic acid in the combination suggested. Where these do not meet the requirements, codeine may be employed as suggested for headache.

Cough. In the stormy period of the disease, the cough may be sufficiently violent to interfere with the rest and comfort of the patient; codeine may be used, ¼ grain (0.015 Gm.) dose every two to four hours, until sufficient relief is obtained. When the cough persists after convalescence is otherwise established, codeine or ammonium bromide may be used with the citrate prescription previously suggested or one of the following prescriptions may be employed:

℞		or
Ammonii Brom.,	ʒij	8|0
Spir. Chloroformi,	fʒiv	15|0
Tinct. Opii Camph.,	fʒvi	22|5
Syr. Tolu	q.s. f℥iv	120|0

M.
Sig.—Teaspoonful in water every two to six hours as needed.

Non rep.

℞		or
Elix. Terp Hyd. et Cod.,	f℥iv	120|0

Sig.—Teaspoonful every two to six hours as needed.
Non rep.

The cough may also be relieved sometimes by simple local measures. Where there is a sense of oppression in the chest, a mustard poultice will often be of benefit, it may be ordered as follows:

1 tablespoonful of powdered mustard
8 tablespoonfuls of flour
1 white of egg
Water a sufficient amount

This should be applied until sufficient redness is induced, usually fifteen to thirty minutes. It may be repeated every four to eight hours as indicated. The following has often been used with apparent benefit:

℞		or
Spir. Camphoræ,	f℥j	30|0
Olei Terebinthinæ,	f℥j	30|0
Olei Olivæ,	q.s. f℥iv	120|0

M.
Sig.—Apply on flannel as directed (Shake-label).

A piece of flannel is moistened with this and applied to the front of the chest; any advantage is probably due to the patient's inhaling the vapor. The patient or family will often ask to be allowed to use some of the proprietary medicines made for the purpose of applying to the chest. These usually contain aromatic constituents such as menthol camphor or winter green, and there is no objection to their employment. The following inhalation may sometimes be of benefit:

℞		or
Mentholis,	ʒj	4|0
Camphoræ,	ʒj	4|0
Tinct. Benzoini Co.,	q.s. f℥ij	60|0
M.		

Sig.—Use a teaspoonful to a pitcher of hot water as an inhalation.

This is best employed by putting a teaspoonful in a pitcher partly filled with boiling hot water. The pitcher is so placed that its top will be below the level of the patient's face; an inverted trough made of a newspaper or some other material is so placed that it will cover both the pitcher and the face of the patient. It should be understood that this trough will be inclined upward from the pitcher toward the face of the patient, so that a draft of fresh, medicated, moisture-laden, warmed air will be directed across the face of the individual. This is preferable to the use of tents or other devices that restrict the ventilation, as this method actually increases the supply of fresh air.

Coryza. This is sometimes a source of great inconvenience although in many cases it is almost entirely absent. The measures previously suggested for cough, particularly the benzoin inhalation seems to give relief. Where there is much coryza, the capsules containing camphor and quinine as previously suggested seem to modify the severity of the symptom. In children some bland oil solution may be dropped into the nose or a ten percent solution of argyrol or neo silvol may be employed.

Nausea. In the 1925 epidemic in New Orleans this was a fairly constant feature of the disease. There seems to be no special measure that meets with much success. Bromides may be tried, particularly the effervescent bromide tablets, these contain fifteen grains (1 Gm.); they may be repeated every three or four hours until the patient is relieved or it has been demonstrated that this measure will not be of benefit. Bromides and alkalies may be given by the Murphy drip. Much may be done for the relief of nausea by the general care of the patient, particularly from the standpoint of rest, sleep, proper diet and proper elimination. Where there is much nausea, capsules are best omitted from routine medication, as previously suggested, and it is better to give powders containing fairly large amounts of bismuth. Carbonated drinks are often of advantage, particularly small, frequently repeated portions of gingerale. During the period of nausea, small, frequent feedings may be given if the patient will tolerate food at all. Sometimes hot applications to the epigastric region may give a certain amount of comfort.

Nervousness. Much can be done in preventing or relieving this symptom by the general care of the patient. From the very beginning, the possibility of this development should be kept in mind and every effort made to give sufficient rest and quiet. Proper elimination, a comfortable bed, an ice bag to the head, warmth to the feet if needed, and other like measures are of benefit. Bromides are sometimes of value. Codeine may be tried. In some cases fairly large doses of acetylsalicylic acid seem to meet the requirements better than anything else; this, of course, would not be used in the presence of even a possible pneumonia. Particularly where there is insomnia, small doses of barbital may be of value.

Fever. There is not as a rule very high temperature. It is seldom, if ever, necessary to use any special measures for uncomplicated cases. High temperature may be prevented or relieved by the usual measures for the general care of the patient, such as an ice bag to the head, rest, proper diet and careful elimination.

Bowels. This has been discussed under routine medication. In a small percentage of cases there may be diarrhea, which can be relieved to a large extent by proper rest, quiet and a careful diet. Sometimes a warm starch enema may be of distinct value. Thirty grain (2 Gm.) doses of bismuth subnitrate may be used. There will seldom be occasion to employ any measures beyond these, except in cases that had chronic bowel trouble previous to the influenza. These would be treated as indicated by the original disease.

Other Symptoms. These may be treated just as though they had occurred in the course of any other disease.

Discussion of Other Drugs and Treatments.—There is much difference of opinion as to the relative advantages and the effects of the many drugs and the many systems of treatment. An expression of opinion on some of these would seem in order here. In this it is necessary to give my personal views although not with the idea that they are by any means the last word.

Morphine.—It is probably not indicated in the treatment of this disease and particularly in the pneumonia. In the first place it is seldom, if ever, necessary to control the symptoms. It certainly interferes with elimination, many have an idiosyncrasy for it and there are in fact so many reasons against its use and no necessity for it.

Strychnine.—Personally I have never used a dose of strychnine in the treatment of this disease except in the form of a tonic when such is indicated during the convalescence. The tendency of the disease is distinctly toward nervous phenomena. In children there is not only a tendency to initial convulsions, but to convulsions during the course of the disease. With these facts and also the pharmacology of strychnine in mind, it seems that we risk rather more in using the drug than we can hope to gain.

Digitalis.—To question the value of this drug, particularly in the pneumonia which so often complicates epidemic influenza, is to invite criticism and possibly may shake the confidence of some in the entire plan of treatment suggested. When a condition arises in the course of this disease that would call for digitalis under other circumstances, there is no doubt that it should be immediately employed, for example, when a patient develops auricular fibrillation, full digitalization is indicated. Aside from this use of the drug, I have not employed it in any one of the last thousand cases that I personally handled. I used it rather extensively in my first series and have seen it extensively employed by others, but am more and more convinced that it is at least of questionable advantage as a routine measure. One fact that is at least worthy of consideration is that the outstanding tendency in this disease is to a slow, regular pulse. As digitalis benefits largely by slowing the heart rate and correcting irregularity, its action here would seem to be either unnecessary or theoretically contraindicated.

Atropine.—With the exception of the rather rare cases of pulmonary edema, it is questionable whether this drug has any place in the therapeutics of influenza or of pneumonia of any type.

Serum.—Various serums have been recommended and may be of considerable value. Personally I have not used them, for one reason because the statistics so far presented have not been such as to indicate any advantage over the plan as here presented.

Cold Compresses to the Chest.—During the epidemic of 1918 this was quite frequently used. The results were highly unsatisfactory.

Convalescence.—The damage, particularly to the circulatory apparatus, resulting from this disease is often out of all proportion to the seeming severity of the attack and the condition of the patient otherwise. It is, therefore, by far the safest plan to carefully supervise the return to activity of all cases. After the temperature has reached a permanent normal, the patient should be confined in bed for a period of days, depending to a certain extent on clinical evidence. After this he may be allowed to resume activity gradually. Restraint should not be entirely removed for several weeks. In the case of elderly people particularly, activities should be markedly circumscribed.

Tonics.—The patient usually feels weak and resents the slowness of his return to normal. It is probably safer to delay the use of tonics if they are used at all. The danger is that one may be given an artificial appetite or an artificial feeling of strength that will cause him to eat or exercise beyond his actual ability. A safe rule is not to give a tonic for at least two weeks after the patient is up and then, if the progress is unsatisfactory, to give something like the elixir of iron, quinine and strychnine phosphate, glycerophosphates compound, or Blaud's pills containing arsenic and strychnine. The matter of the care of the diet has been previously discussed.

Complications.—The most common and the most serious complication is pneumonia. The large majority of patients who die of influenza do so directly or indirectly as a result of this complication. The treatment of this type of pneumonia will not be discussed in detail as the medication is practically the same as for the treatment of lobar pneumonia (page 101). The following brief statements may be made here. The most important factor is an early recognition of this process for two reasons: first, to discontinue the medication that is being used, such as acetylsalicylic acid or other depressants; second that the proper management for pneumonia may be instituted, such as increasing the ventilation, etc. Another consideration is that in the typical influenzal pneumonia one must expect a slower pulse and cannot be guided by the temperature, pulse rate and respiratory rate, as in the common lobar type. There is probably not much necessity for otherwise varying the treatment from that as given for ordinary lobar pneumonia.

Neuritis.—Following the first two epidemics there were a great many cases of neuritis that were rather late in developing. Some treated more neuritis in the six months following these epidemics than they had in the preceding six years. There are no measures that are uniformly satisfactory. Two that have been much used are the injections of sodium cacodylate and deep injections of camphorated oil into the area involved. Acetylsalicylic acid and codeine may give temporary relief. Many cases seemed to be benefited by the use of electric pads, baking or other local measures.

Nervous Phenomena.—The nervous phenomena developing during the course of the disease have been previously discussed. Many cases show a tendency to deviations from the normal that persist long after they are otherwise well. The management of this complication is the same as it would be for the condition arising from other causes.

Myocardial Damage.—This accounts for a fairly large number of the fatal cases particularly those who die suddenly during convalescence. Sometimes the condition is only evidenced by continued prostration or a failure to return to normal strength and general well-being. The usual measures of rest, etc., would apply here as for myocarditis from other causes.

General Weakness.—It is not unusual to find cases that complain of persistent disability. Where definite organic lesions can be excluded, the treatment consists in general care, regular exercise, recreation and proper diet. They may be aided by the use of tonics or change of climate.

There are many other complications such as otitis, encephalitis, meningitis, etc. The treatment of these would not differ from that of the same condition arising under other circumstances.

ACUTE BRONCHITIS

General Statement. Definition.—Bronchitis is a disease characterized by an inflammation of the bronchial tubes. In general use the term is applied to involvement of the trachea as well as of the larger and smaller bronchial passages. In this discussion the capillary bronchitis or bronchopneumonia is not included. In all bronchopneumonia there is involvement of the bronchial tubes, but the pneumonic process is of so much greater importance as to render all else neglible.

Varieties. There have been many efforts to classify all of the various types of bronchitis. One division is into primary and secondary. Those cases are called primary in which the bronchitic process is not apparently secondary to some other definite disease, though as a matter of fact in most cases there is involvement of other structures in addition to the bronchial tree itself. The secondary group includes those cases where the involvement is definitely a part of some other disease, such as measles or whooping-cough. Another classification is into acute, subacute, and chrnoic. Chronic bronchitis is further sub-divided into simple bronchitis, dry bronchitis, bronchorrhea, purulent bronchitis and putrid bronchitis. It is often very hard to place a given case in any one of these groups, and one condition may merge into another.

For convenience of study, bronchitis will be discussed under the two heads of acute and chronic together with their various complications.

Incidence.—This condition is very common and affects any age, sex, race or condition. It is more often found among those who are exposed to conditions that render them susceptible to acute respiratory infections. It is more frequent in the colder seasons of the year and there is often an increase in the number of cases in the fall and spring, when there is a tendency to more rapid changes in temperature.

Etiology.—The exciting cause may be any one of a number of organisms such as the influenza bacillus, pneumococcus, streptococcus, or micrococcus catarrhalis; other organisms may be the cause but less frequently. The predisposing causes are those conditions that render the patient susceptible to acute respiratory infections in general. Among some of the more common influences are sudden change of weather, exposure to drafts, getting wet, inhaling dust or other respiratory irritants, or the chilling incident to going from an overheated room into the cold air; in short, any of those indiscretions that are well known even to the layman as tending to acute respiratory infections. The most common and important cause is direct exposure to infection from someone who is suffering from this or some related infection. It should be borne in mind that the process is usually a part of, or a special type of common cold or epidemic respiratory disease and therefore, is contagious. This does not mean that it is contagious from patient to patient as bronchitis: the same infection may give one patient rhinitis, laryngitis, or bronchitis, and another bronchopneumonia.

Course and Prognosis.—There is no definite course that can be predicted at the onset of the disease; it may last from a few days to many weeks, and varies through a wide range of severity. There is a tendency to remissions and also to relapses. The course of the disease depends to a considerable extent upon the condition of the patient and the opportunity of carrying out the remedial measures. The mortality from bronchitis proper is very low, the danger lying principally in an extension of the process into pneumonia. The importance of bronchitis may be considered from two standpoints: First, the bronchitis may be a complication, or a part of some other disease as measles, whooping-cough, typhoid fever or tuberculosis. The second consideration is the possibility of complications arising from the bronchitis. Among these the two most common are pneumonia and the transition of an acute into a chronic process with all of its dread possibilites such as asthma and bronchiectasis.

Symptoms and Diagnosis. General Considerations.—It should be borne in mind that this condition is seldom confined to the bronchial passages alone; the disease we call acute bronchitis is usually an acute respiratory infection in which the bronchial symptoms more or less predominate; there is usually such other involvement as coryza, sore throat, and laryngitis.

Onset. This may be gradual, the condition apparently an extension of a so-called head cold or sore throat. At times the onset is rather sudden, the outstanding symptoms from the first indicating a predominating involvement of the bronchial passages.

Preceding the more definite evidences of the disease there may be lassitude and general discomfort; this prodromal period if present at all does not usually last but a few hours or a day or two at most.

Chilliness. There may be a sense of chilliness that lasts for several hours: there may be one or more slight rigors, or a definite chill, though the last is rather the exception than the rule.

Fever. This covers a wide range, many cases showing only a slight elevation, others running a rather high and persistent febrile course. As a rule the temperature seldom goes above 102 or 103 in the uncomplicated cases. This high temperature does not usually last more than a few days, but there may be a rather low remittent or intermittent type of fever for many days or weeks. When there is very high temperature and particularly a persistently high temperature, pneumonia must be considered as a possibility.

Pain. As in the case of all acute febrile diseases, there is usually headache which sometimes is quite severe. There is also the general bodily discomfort of pains in the back, limbs, and joints. This headache and general discomfort is not usually as pronounced as in some other conditions, as, for example, dengue.

There is also a tendency to a sense of soreness back of the sternum; very often the patient in describing this will fairly well map out the course of the trachea and large bronchial tubes. This discomfort is sometimes accentuated by coughing. These patients will often complain of a soreness in the lower part of the chest, which is probably largely the result of coughing.

Pulse. The increase in the pulse rate is somewhat in proportion to the elevation of temperature. Acute processes involving the respiratory apparatus probably give a pulse rate beyond that of most other diseases. In the case of bronchitis the increase is not out of proportion to that of other respiratory infections.

Respiration. This is usually increased out of proportion to the temperature, as is the case in most respiratory infections. When there is an asthmatic tendency or where there is obstruction in the respiratory passages, the rate is further accentuated.

Cough. This is a constant symptom. The character of the cough changes with the progress of the disease; during the early stages it is usually dry and non-productive, rather hacking in character; later it takes on a more paroxysmal type and becomes productive. The cough is also influenced to a certain extent by the location of the inflammatory process; if the larynx is involved, a peculiar violent and brassy quality is evidenced. There may be a persistant cough for weeks after the acute symptoms have subsided.

Expectoration. In the early stages of the disease there is very little, if any, sputum. After the first day or two there is usually considerable material brought up. This may be mucoid or definitely purulent, depending on the type of involvement.

Coryza. As previously suggested there is usually associated with the bronchitis an involvement of other parts of the respiratory passages. There may be, therefore, sneezing, nasal discharge, and sore throat, particularly in the beginning of the process.

Cyanosis. This is seldom present unless asthma, pneumonia or some other condition develops.

Gastro-intestinal Symptoms. There is usually a more or less complete loss of appetite during the acute stage. This may persist well into convalescense, in which case it is largely a result of the coughing and expectorating. In some cases there is a tendency to nausea and even vomiting, that is probably a result of the paroxysms of coughing, acting very much as the same condition does in whooping-cough. The intestinal tract is not often directly involved.

Chest Findings. Where the process is confined principally to the larger air passages, very little may be learned by a physical examination. If the smaller passages are more involved the findings may be pronounced. Upon percussion there will be found changes from the normal, depending upon the stage and extent of the disease. Auscultation early may show a harshness of the respiratory note, and sibilant or sonorous rales. Later the excessive secretion results in moist rales of any type.

Laboratory Findings. There is nothing characteristic in the result of laboratory investigation. In the early stages the urine may show traces of albumin and casts, as in other acute febrile diseases. The blood may show an increase in the white count; this is of little value except to differentiate the common types from epidemic influenza.

Differential Diagnosis.—As previously suggested, one difficulty is in deciding whether or not the bronchitis is a part of some other disease as tuberculosis, measles, or pertussis; this can be done in many cases only by watching the progress of the disease and making a diagnosis by elimination. The previous history and the mode of onset are of importance.

The major consideration is differentiating between simple bronchitis and bronchopneumonia; very often this cannot be done. Cabot and others have taken the position that an acute general bronchitis will always have some small areas of pneumonic process. This seems thoroughly logical when it is remembered that the difference between the two diseases is only one of extent of involvement, and is very slight at that. Pneumonia is the severer process and carries a tendency to higher temperature, more rapid pulse and respiration, and greater prostration. From the therapeutic standpoint the differentiation is relatively unimportant, as the treatment of cases of equal severity is largely the same.

Prophylaxis.—This can be considered from two standpoints: one, how to prevent the patient from spreading the disease; the other, how to prevent an individual from acquiring the disease. Acute bronchitis is usually a part of general acute respiratory infections. As these are contagious, it is certainly advisable always to prevent contact as much as possible. This would mean reasonable isolation, particularly during the more acute stage. This will be discussed more in detail under the general management of the case.

To prevent an individual from acquiring the infection, the first consideration is to avoid exposure. Much can frequently be done by building up the resistance of the individual, and these measures should be particularly observed by those who have a tendency to this type of trouble. This would include avoidance of exposure to cold, particularly sudden changes, such as going from an overheated room into cold air without proper protection. In many cases the resistance of the individual can be built up by outdoor exercise, cold baths, sleeping in well ventilated rooms, or even better on a properly exposed porch and wearing clothing that is sufficient for protection without subjecting the individual to overheating. It is probable that the best results in the way of clothing are obtained by wearing moderately light apparel and using wraps or an overcoat of the proper weight when exposed to colder air. It is certainly advisable in all cases to individualize, as a plan that will be of benefit to one will not be found suitable to another. The matter of vaccines will be discussed under a separate head.

Treatment.—This is one of those conditions for which while we have no specific treatment, at the same time much can be done to benefit the patient. Here again no definite system can be outlined that will apply to all cases, but the management will have to be varied to meet the requirements.

General Care.—Many of these cases are so mild that very little in the way of restriction is required, other than to avoid those conditions that are a disadvantage to a patient with this type of infection. When the patient has fever or is suffering much discomfort, it is certainly advisable to confine him to bed and to treat the case seriously.

The treatment-quarters should be selected with the same requirements in view that obtain in the handling of infectious diseases, particularly those of the respiratory type. The room should be occupied by the patient alone, and be one that is not used as a passage-way. It should be as free from noises as possible. It should be one that can be well ventilated; it is particularly desirable to have a room that can be properly heated if the weather is cold. As in the case of all respiratory diseases, an open fireplace is highly desirable, as it lends itself to heating as well as to ventilation. The patient should avoid talking, as this not only may cause direct inconvenience, but may increase coughing and, in case of laryngeal involvement, it may aggravate the morbid process. Smoking should be prohibited in all cases, but particularly if the patient is in the habit of inhaling smoke. In other words, as far as practicable, perfect rest and freedom from respiratory irritants should be maintained. Covering and clothing should be comfortably warm; that is, while there should be sufficient body warmth, sweating or a degree of heat that would cause restlessness, due to discomfort, should be avoided. In the matter of nursing, it is advisable to have a trained nurse at least for severe cases; or if the case is mild and is cared for by members of the household they should be set aside for this purpose as far as practicable. It is better that the nurse be one that is not particularly subject to respiratory infections.

An ice bag may be used to the head if the temperature is sufficiently high or if there is headache or evidence of nervous disturbance. A hot water bottle or electric pad to the feet will oft times contribute to comfort.

Bowels. Proper intestinal elimination should be maintained, but care exercised to avoid violent purgation. Excessive elimination not only disturbs the patient, but increases the tendency to exhaustion and lowers the resistance. One of the principal advantages of proper elimination is to avoid abdominal gases which would interfere with the function of the diaphragm. This is of major importance in all respiratory infections.

Diet.—There is no special diet for this condition: the general rules of dietetics in febrile cases will apply. The acute febrile stage is usually of short duration and during this period of the disease there is certainly no necessity for forced feeding to maintain a high caloric intake. During the acute febrile period, a diet may be given somewhat as follows: Water, carbonated waters, fruit juices, strained soups and broths, malted milk or some similar preparations, tea or coffee, if the patient has been accustomed to using them, and simple carbonated drinks such as ginger ale, root beer, etc. Nutrition will be increased if these soups and broths are made with some cereal, as rice or barley, strained, and fifty per cent of milk or twenty-five per cent of cream added. As the fever subsides and the patient improves, such articles of diet may be added as milk, gelatin, custard and well cooked cereals. Of course if the disease develops into a chronic stage, the nutrition should be increased as rapidly as the digestive ability of the patient will permit.

General Medication.—As previously suggested there is no specific remedy, and general medication is confined to the so-called abortive treatment and to the relief of symptoms. As acute bronchitis is usually the same type of infection as so-called influenza, it would seem justifiable to expect that a certain percentage of them could be aborted if seen sufficiently early. Many plans of treatment have been used. A routine that has been followed to a certain extent in acute respiratory infections, if seen early, is somewhat as follows: A prescription of this type is ordered:

℞		or
Camphoræ Monobrom.,	gr. xv	1|0
Quininæ Hydrobrom.,	gr. xv	1|0
Acidi Acetylsalicyl.,	gr. xxx	2|0
M. ft. cap. no. xii		
Sig.—Six (6) each day.		

The patient is given from four to six of these capsules in the course of a few hours; for example, if the treatment is begun at six o'clock in the afternoon, the patient is given two capsules at six, eight, and ten, if awake. With the first two capsules a hot mustard foot bath is given. While carrying out this measure, a hot drink, such as hot lemonade or hot tea, is administered. The patient is put to bed, protected from drafts, warmly covered, and not disturbed under any circumstances, if asleep. If awake, the medicine is given according to schedule. No purgative is given at this time, for it is highly undesirable for the patient to be exposed or disturbed during the course of a diaphoretic treatment. The next morning a Seidlitz powder or some mild laxative is administered and the patient is given a capsule every two to four hours, depending on the presence of fever and pain. This seems to give satisfactory results in many cases. The difficulty in judging the merit of a treatment of this kind is that to be of value it must be administered early, and if it is administered early, we are not sure as to whether or not we are dealing with a case that would have been troublesome if let alone. A plan of treatment such as this should not be continued after the first 24 to 48 hours of the disease and must not even be considered if there is a possibility of pneumonia.

Symptomatic Treatment. Pain. Most of these cases, especially those running a high temperature, complain of headache and general bodily discomfort; later, if there has been much coughing, there is apt to be muscular soreness, particularly of the lower part of the chest and sometimes of the abdomen. This is largely relieved by the course of treatment suggested in the preceding paragraphs. When additional relief is needed, small doses of codeine may be administered to advantage. This should be used only in sufficient amount to give temporary relief. The matter of chest discomfort, particularly that sense of oppression or constriction that is often complained of, will be discussed under the head of local measures.

Cough. This constant and often distressing symptom will usually be sufficiently relieved by the general care and medication suggested in the preceding paragraphs, and the local measures that will be discussed later. It should be remembered that coughing is often a conservative process of nature and effort should not be made to suppress it entirely. The treatment of this symptom should be limited to a certain amount of relief if the cough is of sufficient voilence to interfere with the well-being of the patient. Very often simple measures such as the administration of cold fruit juices or hot drinks may give some relief. Rest in bed, proper ventilation, body warmth, and the various other measures suggested under general care of the patient are all of value. Where immediate amelioration seems indicated, codeine may be used in ¼ grain (0.015 Gm.) doses, by mouth, in sufficient number to meet the requirements. If the abortive treatment is tried, the capsules suggested have a tendency to relieve cough.

The following prescription will tend to relieve cough and possibly serve the purpose of alkalinization. It may be ordered at once or after the subsidence of the first stormy manifestations.

℞		or
Ammonii Brom.,	ʒj	4|0
Sodii Citratis,	℥j	30|0
Liq. Potas. Citratis,	q.s. f℥vi	180|0

M.
Sig.—Tablespoonful in water every 2 to 4 hours.

This may be given in lemonade, orange juice or other pleasant drinks. It can be continued throughout the acute stage of the disease and often is all that is necessary in the way of medication. Sometimes there is a more or less persistent cough that has a tendency to remain after the case is otherwise clinically well. A prescription somewhat as follows may be ordered:

℞		or
Ammonii Brom.,	ʒiiss	10|0
Spir. Chloroformi,	fʒiv	15|0
Tinct., Opii Camp.,	fʒvj	22|0
Syr. Tolu.,	q.s. f℥iv	120|0

M.
Sig.—Teaspoonful every two to six hours when needed.

Many drugs have been used as expectorants in this class of trouble; these may be roughly divided into three groups. First, those which have a tendency to render the secretions more fluid, and, therefore, more easily expelled. The citrates possibly meet this requirement as well as any other. The nauseants such as ipecac, if used in small doses, have a tendency to increase expectoration. Second, those that lessen the secretions, such as terpin hydrate. Third, those that act centrally by depressing the cough reflex, as codeine or paregoric. In bronchitis these are employed as indicated by the requirements of each particular case. It is often necessary to change from time to time.

Fever. This seldom requires special medication. The type of treatment previously suggested usually answers well: rest, proper ventilation, an ice bag to the head if the temperature is high, and medication as outlined.

Summary. During the acute febrile period where there is a reasonable certainty that no pneumonia is present, some measures such as the capsules of camphor, quinine and acetylsalicylic acid are employed. Following this the citrates in large doses are used. For the relief of chronic cough after the subsidence of other clinical symptoms, expectorants are used as indicated.

Local Measures.—In addition to the use of ice bags and hot water bottles, there are certain other measures that often benefit. It is not claimed that these should be employed in all cases, but at times they have proven helpful.

Inhalations. Where there is a sense of chest discomfort or a tendency to frequent cough, the following prescription may be tried:

℞		or	
Mentholis,	ʒj	4	0
Camphoræ,	ʒj	4	0
Tinct. Benzoini Co.,	q.s. f℥ij	60	0
M.			

Sig.—Use a teaspoonful to a pitcher of hot water as an inhalation.

This is administered by adding a teaspoonful of this liquid to a pitcher nearly full of boiling hot water; it is placed close to the patient's head but on a lower level, and an inverted trough made of newspaper or other material is so arranged that it covers the pitcher and the patient's face. As the pitcher is lower than the face of the patient, this not only does not limit the amount of fresh air, but causes an upward draft of fresh, warm, moisture-laden, medicated air. It may be employed for ten or fifteen minutes several times a day, depending on the condition of the patient and on whether or not it gives relief. Some do not approve in these cases of the use of a croup kettle or any measures that interferes with the supply of fresh air. It may be that with the croup kettle it is possible for the patient to get so much in the way of overheated air that it is actually an irritant.

Sprays. The following spray has seemed at times to be of advantage:

℞		or	
Camphoræ,	gr. i		25
Eucalyptolis,			
Ol. Pini. Pum.,			
Ol. Menth. Pip.,	āā gtt. iv		25
Petrolati, Liq.,	q.s. f℥iv	120	00
M.			

Sig.—Use in atomizer as directed.

This should be used in the type of oil atomizer that throws a cloud of vapor. The patient should be instructed to breathe deeply while it is being employed. It is probably best used after the inhalation suggested in the preceding paragraph.

Applications to the Chest. Various applications are used with more or less success. One of the main considerations is to avoid interference with the chest expansion. To meet this requirement, care should be exercised that nothing surrounds the chest or is used in any way that would render respiration more difficult. A mustard poultice gives a measure of relief in those cases that complain of a sense of constriction or soreness. It is prepared as follows: One tablespoonful of powdered mustard, eight of flour, the white of one egg and luke warm water; this is made into a paste and spread on thick cloth that has previously been cut to fit the front of the chest. The face of this poultice is covered with cheese-cloth or muslin, and the cheese-cloth side is applied to the skin. The advantage of this covering is to facilitate removal of the plaster. The poultice is allowed to stay in place until redness is induced, or from fifteen to thirty minutes. It is then removed and applied to the back for the same length of time. After it is removed, the skin should be cleansed and lightly anointed with cold cream. This process may be repeated every three to eight hours, depending on whether or not it gives relief. Another application that has been helpful at times is employed by using the following prescription:

℞		or
Spir. Camphoræ	f℥j	30 0
Ol. Terebinthinæ,	f℥j	30 0
Ol. Olivæ,	q.s. f℥iv	120 0
M.		

Sig.—Apply on flannel as directed. (Shake-label.)

A piece of flannel is cut to fit the front of the chest, is lightly moistened with this solution, applied directly to the skin and held in place by pinning the four corners to the patient's sleeping garments. It should not be held in place by a bandage passed around the body. The principal advantage of this measure is that volatile products are inhaled by the patient. The flannel may be remoistened every few hours. Very often the family will wish to apply some one of the common proprietary remedies, and there is usually no objection; they may give a certain amount of comfort, psychic at least.

Vaccines. During the acute febrile stage of this disease vaccines apparently have no value; after the process assumes a more chronic character, they probably have a field of usefulness. An autogenous preparation may be employed or the regular polyvalent stock vaccine. In those cases that have a tendency to recurrent attacks vaccines probably have some worth as a prophylactic measure. This is discussed more completely under the head of chronic bronchitis.

Convalescence.—The management of convalescence will, of course, depend upon the character of the disease; that is, whether it has been mild or severe; whether there have been any complications; and the general condition of the patient. We should always bear in mind the tendency to relapses and recurrences, and it is certainly advisable to use great care in permitting the patient to resume his normal activities.

It is often necessary to direct the diet with a view to high nutrition, so as to repair the damage that has been done, build up the resistance, and restore the patient to his normal strength and efficiency. Tonics, such as the compound solution of glycerophosphates or the elixir of iron, quinine and strychnine, may be used.

The management of those cases that go into chronic bronchitis will be discussed under that subject.

Complications.—The principal complications or sequelae are pneumonia and chronic bronchitis; the management of which will be discussed under those heads. As acute bronchitis is usually a part of an acute and general respiratory infection, there is also the possibility of such developments as otitis and sinusitis. These should be managed as where arising from other causes.

CHRONIC BRONCHITIS

General Statement.—Several varieties of chronic bronchitis are recognized. The most acceptable classification is that of simple chronic bronchitis, dry bronchitis, bronchorrhea and purulent bronchitis. In addition to this there may be many associated conditions, such as bronchiectasis, that are to be regarded as complications or sequelae of the disease under discussion.

Incidence.—Any type of individual may be affected. The disease is most commonly found among those who are most exposed to conditions that tend to the development of respiratory infections. Men are therefore, more subject than women. It is rather frequent in childhood and fairly common in old age. It is naturally most troublesome in the colder months and there is a tendency to exacerbations in the fall of the year, and to a less extent in the spring.

Etiology.—This was discussed in part in the preceding section on the acute bronchitis. Acute bronchitis is usually a part, or at least began as a part, of some other more general infection, such as measles, whooping-cough or influenza; chronic bronchitis is usually a sequal to the acute type of the disease. Many factors play a part in the etiology. Among these are repeated attacks of acute respiratory infections, asthma, inhaling respiratory irritants and excessive exposure. The bacteriology is the same as for the acute disease.

Course and Prognosis.—The condition is rather resistive to treatment, and prone to lend itself to the development of further trouble, such as asthma or bronchiectasis. There is also a tendency to intermissions and remissions and it is rather difficult to be able to tell a patient, with any degree of assurance, when he has been cured. Even when an apparent cure is affected, a recurrence is not uncommon.

Symptoms and Diagnosis.—It is impossible to lay down a definite set of rules covering the diagnosis of this condition, and where it has existed for a sufficient length of time there are very apt to be other factors that will influence the data obtainable. Again it may run a protracted course and yet be so mild as to fail to present any definite symptoms other than a tendency to cough.

Fever. There is usually elevated temperature and at times this may be quite pronounced. The condition at least demands a carefully kept temperature chart covering several days in order to show the febrile reaction. There is a tendency to remissions and intermissions. In uncomplicated cases the temperature is seldom high.

Pulse. The pulse rate usually increases out of proportion to the temperature, though this finding is not constant.

Respiration. There is more or less increase in the respiratory rate. In severe cases, this may be quite pronounced.

Pain. There is often a sense of more or less general discomfort, with a tendency to headache and soreness of the chest; these depend to a large extent upon the frequency and violence of the cough and the height of the temperature. Pain is not a pronounced factor in uncomplicated cases.

Gastro-intestinal Disturbances. Except in those cases that have an active cough, considerable expectoration, or high temperature, there is not much gastro-intestinal disturbance. There is, as in most cases of sickness, a tendency to impaired appetite.

Cough. This is the one constant symptom; it may be mild, fraught with little discomfort and scarcely noticeable, or it may be so persistent and frequent as materially to interfere with the well-being of the patient. It is usually one of the first symptoms to appear and the last to disappear.

Expectoration. As previously stated, there is a type of the disease known as dry bronchitis; in this type the cough is of the so-called hacking variety and there is very little expectoration. In other types the matter brought up may be large in amount.

Dyspnea. In uncomplicated cases this is not often a symptom. The presence of much dyspnea would suggest asthma or some other condition.

Findings of Chest Examination. In the simple cases there is found a tendency to harshness of the respiration sounds and râles of various types. In the dry cases the sibilant or sonorous rales will materially predominate. In the moist cases some of the moist rales will be present. In many instances the various sounds are mixed. They are usually bilateral and general, but may be found principally on one side and are often most evident toward the pulmonary bases. In those cases complicated by asthma or other involvement the results from such complications may, at least at times, entirely overshadow or obscure the primary condition.

Laboratory Findings.—These will depend entirely upon the character of the case. There is, of course, a tendency to an augmented total white count. The urine at times will show evidence of renal irritation to the extent of traces of albumin and casts. In the complicated case the findings will, naturally, be governed by the nature of the involvement.

Differential Diagnosis.—The principal condition from which chronic bronchitis must be differentiated is tuberculosis; the differentiating features are the tendency for bronchitis to be bilateral and involve principally the lower parts of the lungs. It must be remembered that chronic bronchitis may be present with the tuberculous process. In asthma it is often hard to tell whether or not there is a background of chronic bronchitis. This matter will be discussed under the head of asthma. Cardiac or renal disease, and other conditions that would affect the circulation, will sometimes make a diagnosis difficult except by careful investigation and continued observation.

Treatment.—This is one of those conditions in which there is no specific treatment, but in which much can be done for the relief and cure of the patient. One of the principal considerations is to determine the extent of the involvement, and the presence or absence of associated diseases or complicating factors; where such are found, they require appropriate remedial measures.

General Care.—These cases usually do not require confinement to bed, though, of course, this must be determined by the condition of the individual. In most instances certain restrictions, at least, are necessary. The patient with chronic bronchitis should be protected from violent exercise, exposure to bad weather, or other conditions that experience has taught might react unfavorably. It is sometimes necessary to have individuals suspend, or even change, their occupations. Care should be exercised in the matter of clothing in the ambulatory cases; for example, they should take more than the usual precautions in the way of wearing warm underclothing, overshoes, and overcoats or wraps, and sleeping with the proper amount of covering. There is considerable difference of opinion as to the advantage of outdoor sleeping for these cases; in pleasant weather the majority are probably benefited by sleeping on a screened porch, but they should always have a room to which they can retire in unfavorable weather. Outdoor sleeping cannot be indiscriminately recommended. The bedroom should be properly ventilated but drafts avoided. There should be sufficient covering but care exercised to prevent overheating. Febrile cases should, of course, be rigidly confined to bed, and very often for patients who are not showing any appreciable elevation of temperature, a period of rest in bed will prove of great benefit.

At times a change of climate will effect much relief. Individualization is necessary as no set rule can be followed. Some will do well in a high, dry climate; others seem benefited by the seashore or in the pine woods.

Smoking is certainly a disadvantage and should be prohibited if possible. Alcoholic excesses must be avoided; in fact it may be said that any condition that lowers the state of well-being of an individual reacts unfavorably on the progress of the case.

Diet.—The two principal factors to be considered are the digestive ability and the nutritional requirements of the patient; for example, a febrile case or one running a toxic course is not capable of handling any large amount of food; again a person who is full-weight or overweight will not require as intensive feeding as an under-weight or weak individual. In the majority of cases in which the condition of the patient will justify it, an unrestricted menu may be allowed. Where the state of nutrition is low, it is best to give a diet free from food that is poor in nutritional value, and free from material that would make a tax on the digestive organs. The main-stay of the diet should be milk. If sufficient milk, cereals, and fruits are employed, the rest of the diet can usually be left to the wishes of the patient, provided reasonable restrictions are enforced. These matters have been discussed at length under the head of tuberculosis.

General Medication.—As previously stated, there is no specific and the medication will depend upon the condition of the patient; in other words, it is largely symptomatic. Where there is fever and general discomfort the following prescription may be used:

		or
Camphoræ Monobrom.,	gr. xv	1|0
Quininæ Hydrobrom.,	gr. xv	1|0
Acidi Acetylsal.,	gr. xxx	2|0

M. ft. cap. no. xij
Sig.—One every two to four hours as needed.

This may be suspended when the condition has sufficiently improved In the dry type of cases benefit will be obtained by the use of those agents that tend to increase the fluidity of the bronchial secretions. The following prescription may be employed:

		or
Ammonii Brom.,	ʒj	4|0
Sodii Citratis,	℥j	30|0
Limonis Succi.,	f℥j	30|0
Liq. Potas. Citratis,	q.s. f℥vj	180|0

M.
Sig.—Tablespoonful in water every two to four hours.

Sometimes even those cases where the expectoration is rather profuse will be benefited by at least a short course of the medication just suggested. In the course of treating the same case, it is often advisable to switch from one plan of treatment to another. Where the expectoration is too profuse the following prescription may be used at least for a time:

℞		or
Elix. Terpini Hyd. cum Cod.,	f℥iv	120|0

Sig.—Teaspoonful in water every two to four hours.

This may be ordered with or without codeine. The small amounts of this agent present does not bring the preparation under the narcotic law.

In many of these cases, particularly as they become afebrile, the iodides seem to serve a useful purpose and may be given, as potassium or sodium iodide, beginning with about 5 grains (0.3 Gm.) gradually increased until the desired effect has been obtained, or it has been demonstrated that they will not meet the requirements. The syrup of hydriodic acid has been extensively employed and apparently with a certain measure of success.

Cod liver oil in its various forms has been used by generations of doctors; the chief disadvantage in this preparation is its effect on the appetite. It is probable that some of the emulsions, such as the egg emulsion, have every value of the pure oil and are free from some of its disadvantages.

Creosote is used alone or in some of its combinations. One of the ready prepared preparations containing creosote may be tried or creosote may be added to other medication, as to the emulsion of cod liver oil, or petroleum emulsion.

It seems that the treatment, to a large extent, must be experimental, and certainly must be changed from time to time to meet the changes in the patient's condition.

Local Measures. A modification of the local measures suggested for acute bronchitis may be tried out here. The following spray may be of benefit:

		or	
Camphoræ,	gr. iv		25
Eucalyptolis,			
Ol. Pini. Pum.,			
Ol. Menth. Pip.,	āā gtt. iv		25
Petrolati Liq.,	q.s. f℥iv	120	00

M.
Sig.—Use as a spray.

This should be used in an atomizer that throws a cloud of vapor, and the patient should breathe deeply while using it.

The following inhalation may be tried:

		or	
Mentholis,	ʒj	4	0
Camphoræ,	ʒj	4	0
Tinct. Benzoini Co.,	q.s. f℥ij	60	0

M.
Sig.—Use a teaspoonful to a pitcher of hot water as an inhalation.

This is particularly useful in those cases where there is a tendency to exacerbation at night, and sometimes by employing a measure of this kind a better night's rest may be obtained.

Local applications to the chest, such as a mustard poultice or camphorated oil and turpentine, seem to be of some benefit. The following prescription illustrates how these may be ordered:

		or	
Spir. Camphoræ,	f℥j	30	0
Ol. Terebinthinæ,	f℥j	30	0
Ol. Olivæ,	q.s. f℥iv	120	0

M.
Sig.—Use to moisten flannel and apply to chest. (Shake-label.)

This, also, can be used at night, particularly in those cases that have an exacerbation of symptoms at night, and may contribute toward inducing sleep.

Vaccines. If bacterial vaccines have a field of usefulness in the treatment of respiratory infections, it is in this condition. Theoretically, of course, the autogenous preparations are the ones to be used. Some prefer to try out the stock preparations, and if relief is not obtained, to have an autogenous vaccine prepared. The stock vaccine most commonly used is the mixed polyvalent preparation containing the organisms most commonly responsible for acute respiratory infections, which is usually known under the name of "Influenza vaccine mixed." With any of these it is best to begin with small doses and to continue the treatment for a considerable period.

Convalescence.—The physician must remember the tendency to relapses and reinfections and make every effort to build up the strength and resistance of the patient, and to protect him from those conditions that might cause a recurrence of the trouble. The matter of diet should certainly receive careful attention. Very often tonics will be of value; these of course, will depend upon the symptomatic conditions present, such as anorexia, anemia, and weakness.

Complications.—Complications such as asthma and bronchiectasis will be discussed under separate heads.

BRONCHIECTASIS

General Statement. Definition.—This is a condition that is characterized by dilations or sacculations in the bronchial tubes. There may be one or many such areas and they may be large or small. In the majority of cases they are many and of various sizes. Several types are recognized and have been designated according to their character, as cylindrical, fusiform or saccular.

Incidence.—This is a condition peculiar to middle life and old age. It is more common among men. As the lesions harbor foci of infection it naturally follows that these patients experience more discomfort during the colder months when the bacteria of the respiratory tract are more active.

Etiology.—There is still considerable difference of opinion as to the processes leading up to the condition that is present at autopsy, and it is probable that the lesions under discussion may result from one or more of several pathological processes. The condition is secondary to other diseases, such as tuberculosis and chronic bronchitis. It is usually slow in developing. The fever, excessive secretions, and other disturbing factors are the result of the activity of microorganisms that have invaded these points of lowered resistance.

Course and Prognosis.—The condition is essentially chronic and tends to progressive extension of involvement. It is possible for improvement or even a cure to be effected, if the condition is recognized sufficiently early and the proper measures instituted. Such a happy outcome is, however, decidedly the exception. The damage to the bronchial structures results in a prolific field for the development of pathogenic organisms that tend to act as foci from which acute diseases may from time to time be initiated. The tendency is also, naturally, toward the exhaustion of the vital resources of the patient; in other words, the life expectancy of the victim of bronchiectasis is rather short, and the outlook even for relief is distinctly discouraging.

Symptoms and Diagnosis.—Theoretically it is very easy to diagnose bronchiectasis, and in the advanced cases it is often comparatively easy. In the early stages of the disease the diagnosis is fraught with much difficulty and is usually reached only by the proper evaluation of complete clinical data.

History. Of much importance is the history of long duration and resistance to treatment. The history of preceding diseases such as chronic bronchitis or tuberculosis is also highly significant.

Cough. This is an almost constant finding, though there may be periods during which it is negligible. The principal characteristics of this cough are its paroxysmal and productive character, and more particularly the fact that the cough may be precipitated by a change of position.

Expectoration. A characteristic feature of the expectoration in this disease is the tendency for considerable amounts of material to be brought up at more or less regular intervals, and between these periods for there to be comparative relief. Another rather constant finding is that the expectoration of material may be precipitated by a change in position. This sputa may be largely mucoid, but is usually of a distinctly purulent character. The odor is often disagreeable and at times highly offensive.

Temperature. There is nothing distinctive in the temperature in this disease. There is usually some fever, though not high; any considerable elevation means some complication. A carefully made temperature chart will usually show a tendency to afternoon elevation. These patients are particularly subject to attacks of acute respiratory infections and these may be accompanied by considerable febrile reactions.

Pulse. There is a tendency to increased pulse rate, though there is nothing characteristic.

Dyspnea. This sooner or later is a fairly constant finding. During the paroxysms of coughing and the expectoration of large quantities of material, there may be marked dyspnoea and cyanosis, very much as in the paroxysms of whooping cough. This, however, is not constant and may be entirely absent. Where there is considerable damage to the respiratory apparatus, we naturally find more or less interference with the respiratory function.

Loss of Weight. There may be considerable involvement without any appreciable interference with a sufficient state of nutrition. This is particularly the case where the individual is receiving proper treatment, including sufficient rest and a high caloric diet.

Clubbed Fingers. This may develop early but is particularly marked in cases of long duration. There is nothing distinctly characteristic about the fingers in this disease, as the same abnormality may obtain in other pathologic chest conditions.

Examination of Chest. The chest findings will be influenced very largely by the disease that has resulted in the development of the bronchiectasis, such, for example, as fibroid phthisis or pleural involvement. Upon auscultation the evidence will be directly influenced by the size and location of the cavities or dilations, and by the presence or absence of fluid content; the characteristic evidence is the change in findings upon the emptying of the fluid accumulations. In percussion. the same condition applies as in auscultation. A cavity containing fluid will give impaired resonance; after the emptying of this material. there may be the evidences of cavity. Here as in auscultation the characteristic feature is the change in the findings that can be produced by emptying the accumulated material. There is a tendency for the lesions to be confined to the lower part of the lungs.

Laboratory. There is nothing characteristic here except the presence or absence of the bacilli of tuberculosis, elastic fibers, etc., in the expectorated matter.

X-ray. This constitutes one of the most valuable aids in diagnosis, not only as to the presence of the process, but also the extent. The use of lipiodol has much increased the value of this measure.

Differential Diagnosis.—The principal difficulty is to differentiate bronchiectasis from tuberculosis and this is sometimes practically impossible. The two conditions may be coexistant, particularly as either process may favor the development of the other. As previously suggested, the diagnosis of bronchiectasis can be established in many cases only by careful investigation and continued observation.

Prophylaxis.—The principal consideration is the proper attention to those diseases that are known to tend toward the condition under discussion. It is hardly necessary here to go into this in detail, as this matter has been discussed under the heads of the other diseases.

Treatment.—There is no specific treatment and the outlook for the patient is rather discouraging. The first consideration is the removal of complicating conditions, particularly the treatment of the primary disease such as chronic bronchitis or tuberculosis.

General Care. This will naturally depend upon the condition of the individual, and will have to be varied from time to time to meet the changing requirements. Most of the cases are ambulatory and lead fairly active and useful lives. A large percentage of them only present periods during which certain restrictive measures have to be enforced.

Rest. This is naturally of advantage in all cases. During periods of fever or much discomfort absolute rest should be required. Under any circumstances patients should be instructed as to the necessity of taking advantage of all opportunities to give themselves the benefit of a reasonable amount of rest.

Fresh Air. Sufficient fresh air is a necessity. In favorable weather outdoor sleeping is of distinct advantage, and under all circumstances sleeping, living, and working quarters should be properly ventilated.

Clothing. The clothing and covering should, at all times, be such as to lessen the tendency to acute respiratory infections; in fact the ventilation and clothing should be very much the same as in the case of tuberculosis.

Exposure. As these patients have a marked tendency to exacerbations, all unnecessary exposure should be avoided, as outlined under the discussion of acute and chronic bronchitis and tuberculosis.

Exertion. Patients should lead a quiet life, free from physical excesses. If, in the ambulatory cases, the patients are continuing their vocations, over-exertion should be carefully avoided.

Climate. In selected cases climatic treatment will be of benefit. There is no particular place that has a specific value. Usually a moderately high altitude and dry climate are of advantage, and it is certainly better to avoid severe weather. Many cases obtain benefit by going South in winter and North in summer.

Diet.—This will depend, of course, on the condition of the patient. During the febrile periods necessary restrictions will have to be imposed, in consideration of the lowered digestive ability. As a general rule the diet should be the same as in tuberculosis. An effort should be made to keep the individual up to a high nutritional standard. Milk products, fruits, cereals, etc. are used as in the treatment of pulmonary tuberculosis.

General Medication.—In this there is little to do beyond attention to symptoms. At times tonics may be employed to advantage; for example, the solution of glycerophosphates, elixir of iron, quinine, and strychinine, or similar preparations. These, naturally, have no specific value and are used only when indicated by the condition of the patient.

At times sedatives may be indicated for sleeplessness, excessive cough, or other conditions; it must be taken into consideration here that the disease is essentially chronic, and conservatism must be shown, particularly in the use of opiates.

Expectorants. Among those that have proved of most benefit are the citrates and the preparations of ammonia; it is probably inadvisable to employ ipecac or other nauseants. Where there is much bronchorrhea it may be of advantage to use such agents as terpin hydrate in an effort to lessen the secretions.

Local Medication.—There are some simple local measures that may contribute to comfort, among which may be mentioned the following prescription:

		or	
Camphoræ,	gr. vi		4
Eucalyptolis,			
Ol. Pini Pum.,			
Ol. Menth. Pip.,	āā gtt. vi		4
Petrolati Liq.,	q.s. f℥vj	180	0
M.			

Sig.—Use in atomizer as directed.

This should be used in an atomizer that throws out a cloud of vapor. The patient should be instructed to breathe deeply while the remedy is being employed. It may be used every few hours if it gives relief.

One of the following inhalations will at times give relief:

		or	
Mentholis,	ʒj	4	0
Camphoræ,	ʒj	4	0
Tinct. Benzoini Co.,	q.s. f℥ij	60	0
M.			

Sig.—Use a teaspoonful to a pitcher of hot water as an inhalation.

		or	
Cresoti,	fʒij	8	0
Tinct. Benzoini Co.,	q.s. f℥ij	60	0
M.			

Sig.—Use a teaspoonful to a pitcher of hot water as an inhalation.

These are best employed by having the patient lie with his face near the edge of the bed and placing a pitcher partly filled with boiling hot water and containing the medication close to his head, but on a lower level. An inverted trough made of newspaper or other material should be placed so as to cover both the pitcher and the face of the patient. This covering when so arranged inclines upward from the pitcher and thus carries a draft of warm, moisture-laden, medicated air. This inhalation may be followed by the use of the oil spray mentioned in the preceding paragraph. Some have suggested the use of creosote vapors in a closed room and favorable results have been reported by many competent observers. Many other measures have been suggested, such as the instillations of argyrol, creosote, and various oils. In selected cases they may be of benefit.

Mechanical Measures. The most important of these is the postural evacuation of the material that accumulates in the cavities. Very often a patient will learn from experience that turning on the face or on a particular side will favor the removal of the secretions. In some cases lying with the foot of the bed considerably elevated will give satisfactory results. The patient may droop the body over the foot of the bed or the back of a chair or some other convenient object, in such a way as to invert the bronchial tree and simply pour out the accumulated material. These various measures may be used as often as is necessary to meet the requirements.

Vaccines. As many of the unpleasant symptoms are the result of bacterial invasion it would naturally seem that bacterial vaccines would be of benefit. These have been extensively used but, so far, with discouraging results. They probably have a field of usefulness and should be thoroughly tried out in all cases. The stock and autogenous vaccines are both employed, and where one fails to be of benefit the other may be tried. The stock preparation most commonly used is the "Influenza Vaccine, mixed" and contains the organisms most commonly responsible for acute respiratory infections, such as the pneumococcus, streptococcus, and influenza bacillus. To be of benefit they should be begun in small doses and continued for a considerable period of time in increased amounts.

Surgery. Favorable results have been reported by various surgeons, but it does not seem that this type of treatment can be recommended. It is possible that in the future beneficial surgical measures may be developed.

Complications.—Complications such as hemorrhage, tuberculosis, abscess or gangrene, may be treated the same as when arising from other causes.

LOBAR PNEUMONIA

General Statement. Definition.—Lobar pneumonia is an acute infectious disease caused by infection with the pneumococcus and characterized by certain definite pulmonary changes.

Many varieties of the disease are recognized, depending on the character and location of the involvement and the course of the process. These include such subdivisions as apiceal, double, massive, typhoid, postoperative and terminal. Another classification depends on the type of the infecting organism as type I, II, III and IV.

Incidence.—No one is immune, but the incidence is affected to some extent by many conditions.

It is more common in the winter and spring.

It more frequently occurs in those climates subject to frequent changes of temperature.

The greatest period of susceptibility is late childhood and early adult life.

The incidence is greater among men than women, among outdoor than indoor workers.

Etiology.—The infecting organism is the pneumococcus. Many predisposing factors may play a part, some of these have been suggested under incidence. Among the others of particular importance are chilling of the body, exposure and the presence of other respiratory infections.

Course and Prognosis.—The disease usually runs a stormy course, reaching the crest about the seventh or eighth day when in favorable cases the process terminates abruptly by crisis or begins to improve slowly (lysis).

The mortality probably averages about 25 per cent.

The principal causes of death are toxemia and complications, the most common of which are cardiac involvement and empyema.

Symptoms and Diagnosis.—An early diagnosis is of major importance and largely influences the ultimate outcome. It is unquestionably a fact that a fairly large per cent of the cases of pneumonia are not treated as such until the condition is well advanced. The principal dangers here are that the patient does not have the advantage of those measures that are of particular advantage and they are subjected to treatments, particularly medication of a depressive type, until actual damage has been done. In any case in which pneumonia is a possibility, thorough and systematic examinations should be made at such frequent intervals as to render an early diagnosis almost certain and, where any uncertainty obtains, the patient should be given the benefit of the doubt and put on the treatment for pneumonia. Not only should the physical examinations be frequent and thorough, but careful attention paid to all details, such as the character of the cough, the sputa and the location of pain. Any case of acute respiratory disease that shows a tendency to persist in a stormy way beyond 24 hours should be regarded at least with suspicion.

Onset. This is usually rather stormy in character. The patient when first seen is evidently quite sick. The condition is often ushered in with a chill in the adult and sometimes by a convulsion in a child.

Respiration. This is rapid and shallow and often develops a grunting character, the patient making an audible sound with each breath, though he may stop this when the attention is fixed, as during conversation.

Pulse. In the early stage the pulse is rapid and rather full or bounding in character. It tends to continue rapid throughout the course of the disease, but later becomes weak and thready. The pulse and respiratory rate are rapid, out of all proportion to the temperature as compared with most other diseases.

Fever. The temperature is usually high and the rise is rapid. This often is a diagnostic point of considerable importance. The fever in favorable cases usually subsides by crisis.

Pain. In addition to the headache and backache and the general discomfort that attend the majority of acute febrile diseases, in pneumonia there is usually a chest pain that is pleuritic in type; in fact, is the result of a secondary pleurisy. This does not ordinarily persist throughout the course of the disease but may do so. The usual course is for it to last as an acute pain for one or two days, and it is a fairly common error to diagnose pneumonia as a primary pleurisy and strap the side in such a way as to largely prevent further examination and thus obscure a correct diagnosis.

Cough. This is always present though there may be a varying degree in its violence. It persists throughout the course of the disease and well into convalescence. During the early stage, if the cough gives rise to pain, there may be a marked tendency on the part of the patient to suppress it.

Sputum. The expectorated material may be bloody streaked, but the characteristic type for lobar pneumonia has been best described as "brick dust" in appearance. It is highly important in the management of any case that might be pneumonia to have the sputa examined as to character.

Physical Examination. Inspection. Even in the early stages of the disease the patient looks ill. The face is usually flushed and may show evidences of pain, and later there is a tendency to cyanosis. Herpes, particularly around the mouth, is a fairly constant finding and may develop early. Inspection of the chest may show impaired motion of one side. There may be an inequality of the pupils.

Palpation. Palpation may reveal a friction rub of a secondary pleurisy and early may give evidence of pathological changes through a unilateral impairment of expansion. There may be tenderness on pressure in the area involved.

Percussion. Depending on the stage of the process in the lung, the findings on percussion vary, but uniformly throughout the course of the disease there is evidence of involvement in the diseased area.

Auscultation. The findings here are varied, depending on the stage of the process and, if the pathological changes are borne in mind and taken into consideration with the probable stage of the disease in the particular patient, auscultation gives us the most valuable information obtainable. In fact, the diagnosis is most often made by the interpretation of the findings on percussion and auscultation.

In making these examinations, it is of great importance to remember that with a patient lying on the side, allowance has to be made for the natural comparative difference of the two sides of the chest, due to the position; so before attaching too much importance to the findings, the patient should be turned over on the other side and the examination repeated. When the patient is able to sit up, as in the early stage of the disease, this, of course, is the very best possible position for the examination. Very often the adult patient, and always a child, can be turned on the abdomen for an examination of the back. In this position the head is turned to one side and there may be sufficient turning of the body to be misleading in interpreting the comparative findings, so the patient's head should be turned always to the other side before finally interpreting the results. It is particularly in the diagnosis of this condition that the old saying of Jenner applies so well: "It is usually not looking, instead of not knowing that gets us into trouble."

Treatment. General Care. Fresh Air. There are three classes of treatment from the standpoint of ventilation. One group advocates unlimited fresh air in all climates, under all conditions, in all types of pneumonia, keeping these patients on an open porch or other available open space. There is another group that still confines the patient to a close room. This would hardly seem credible in the light of present medical knowledge, yet any consultant of large experience will acknowledge that in a large per cent of the cases he is called to see, he finds this condition obtaining. Then there is in this disease, as in many others, a group that pursues a modified course, using more or less fresh air treatment, depending on the condition of the patient, the type of the disease, the character of the weather and various other factors. This plan probably gives the best results. First, we may be guided by the history of the patient as to whether or not he has been used to sleeping in the open, or has been accustomed to modified ventilation. Again, we may take into consideration the condition of the weather. In fairly pleasant weather, almost any one can be treated to advantage on a screened porch. We can also be influenced to a certain extent by the reaction of the patient to the change in his accustomed ventilation. Probably the best place for treatment is a corner room with large windows on two sides and an open fire place. The patient's bed may be placed between the windows, somewhat as shown in Fig. 1. Both windows should be kept open under all ordinary circumstances and only closed when there is cold, rain or wind sufficient to be undesirable. The patient can be protected from drafts by a plain screen that can be adjusted to meet the requirements, when needed at all. In cold weather a comfortable grate-fire not only will modify the temperature of the room and serve for the comfort of the patient and nurse, but actually favors ventilation by keeping a current of used air passing out of the room by way of the chimney.

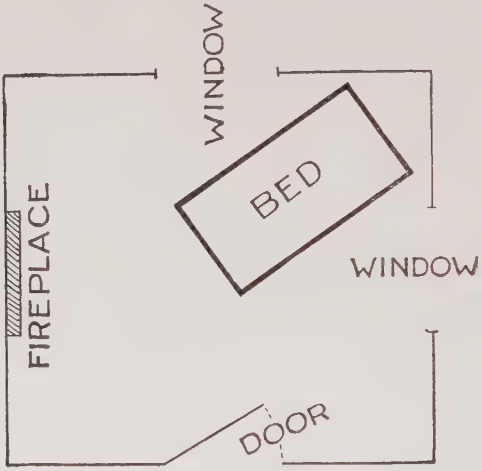

Fig. 1.

Treatment Quarters. The room should be selected not only from the standpoints of ventilation, heating, lighting, freedom from noise and isolation, but it should not be one that is used as a gathering place or passageway. This is easily arranged in large homes but it may cause considerable readjustment of family affairs in a small house. The fact must be remembered from the beginning that rest, both mental and physical, particularly sleep and freedom from worry, are important factors in conserving the heart and that cardiac failure is the condition most to be dreaded. Not only this, but the physician should see that any annoying and unnecessary noise in the neighborhood is prevented. In most cities the police department will establish a "quiet zone" on request, and I have even had a policeman assigned to a neighborhood to see that this is respected. Much unnecessary noise also can be avoided by sending to the neighbors and explaining the necessity for the patient's being undisturbed and requesting that children be instructed in the matter of whistles, roller skates and other forms of annoyance. An appeal to the Boy Scouts will often result in securing everything that could be wished.

The Bed. The usual instructions have been to use a hospital type of high, narrow bed, which certainly renders it more easy to handle the patient. A consideration, however, that should not be overlooked, is the fact that we are planning to give this patient as much comfort as is possible; and, where he has been accustomed, possibly for many years, to a particular bed and mattress, it is often inadvisable to change, if they will meet even approximately the requirements of the nurse in handling the case. It is highly desirable that the bed be one that does not have a solid head and foot board, as they interfere with ventilation. The mattress should be comfortable and of such a type as will not favor the development of bed sores, should the illness be protracted.

Covers. These should not be too heavy, but sufficiently warm to meet the requirements. The usual tendency is to over-cover the patient and unnecessarily weigh him down, which is particularly undesirable; and to keep him too warm, which tends to promote restlessness and sweating.

Clothing. The patient should be clothed in such a way as to render access to the body easy for examination, bathing, etc., but, at the same time, to prevent exposure. In men, this is seldom a problem that disturbs; but in women who are accustomed to the thin, sleeveless and neckless gowns, it is sometimes difficult to persuade them to adopt a type of garment that will not expose them to chilling every time the covering is lowered or an arm is put out. Probably the best garment is an old flannelette or woolen pajama coat (a new one may be uncomfortable). This may be worn over the usual thin gown if desired. There is usually some one in the household who can supply a garment of this type. It may be necessary to slit it up the back for convenience.

Heating. As previously suggested, the best form of heating is probably an open grate, though hot air, hot water, or steam will answer well. Gas stoves or oil heaters should never, under any circumstances, be used.

Selection of Nurses. This is a matter of the greatest importance. The effort should never be made to have a nurse do double duty in pneumonia. It has been stated that, in typhoid fever, a good nurse is of greater advantage than a good doctor; if this be entirely true in any case, it is true in pneumonia. It is usually possible for the physician in the course of years to build up a group of nurses that he has trained especially in his method of handling these cases and use these for pneumonia patients, even if they have to be taken away from other duty. The nurse must be instructed to dress warmly; in fact, the physician should insist that she does so, or there may be a temptation for her to modify the ventilation in cold weather. A grate fire in the room will contribute much toward keeping the nurse comfortable and in this way will contribute towards getting the measure of ventilation properly and continuously carried out.

Position of the Patient. Usually this can be left to the natural tendency of the individual, as he instinctively seeks that position which gives him the greatest amount of comfort and this means, among other things, the best breathing facilities. However, patients can not always be entirely trusted in this matter and the nurse should be properly instructed. The patient should lie either upon his back or on the diseased side. There is sometimes a tendency to lie continuously in one position. It is better to have the position changed occasionally.

Time Charts. It is often of advantage to arrange a time chart for the various measures that are instituted, else there will be too frequent disturbances. The physician knows, or should know, just what he wants done and when, and this should not be left to the nurse who is less perfectly informed. Time charts may be arranged by using an order sheet, giving the hours, as 7 A.M., 8 A.M., 9 A.M., etc., and putting down for each hour what is to be done or a notation that nothing is to be done; it being understood, of course, that this order can not be arbitrarily followed, but must depend upon conditions, as for instance, the patient's being asleep at the time scheduled for some attention. The main advantage of this is the grouping together of details of attention and thereby giving longer periods of rest. The nurse should be instructed that while the patient is being disturbed for one thing, other measures can be carried out at the same time with perfect convenience. For example, at 8 A.M. there may be the bath, nourishment, the ice bag refilled and any other attention that might be needed, arranged in the order in which it can best be carried out. This principle can be applied to all periods of the day.

Fairly large quantities of water are of advantage here for the same reasons that they are in other acute infectious diseases. They dilute the toxins, favor elimination and contribute to comfort. Water may be given as such or in the form of fruit juices and various other liquids.

The ice bag should be used continuously throughout the febrile period. This does not mean, of course, that it can not be left off for short periods, but its use is continuously indicated. It seems to be beneficial from many standpoints. The nine inch, screw cap, so-called English ice bag is probably the most desirable and it should be filled in such a way as to permit of its being applied to as large an area as possible. The scalp should be protected by one or more thicknesses of towel.

A hot water bottle, electric pad, or some other means of keeping the body and feet warm are of great advantage, in cold weather.

Bathing. A cleansing bath should be regularly given and warm water is the most desirable. Baths for the reduction of temperature are seldom, if ever, indicated in this disease.

Care of the Mouth. There is a particular tendency for the accumulation of sores. The mouth should be cleansed several times daily. Patients can often best do this for themselves by having a piece of gauze wrapped around the finger, dipping it in some solution, and using it somewhat as a tooth-brush. Many have recommended various antiseptic preparations, without much regard to their being pleasant. There are a great many dental preparations on the market and, if the patient has become accustomed to the use of one of these and likes it, there is certainly no reason for changing, and he should be continued in the use of his favorite dentifrice.

Diet.—There are three plans in common use. One is to give a full diet on the contention that it is desirable to have the patients in a high state of nutrition as the crisis approaches so that they will have the greatest possible amount of strength for the ordeal. There are others who disregard the matter of nutrition almost entirely. It is probable that a modified course, may be followed to advantage. It should be borne in mind that one of the most distressing and disturbing factors in the progress of the case is abdominal distention, not only favoring the absorption of toxins and rendering the patient uncomfortable, but interfering with the action of the diaphragm and thereby with that of the lungs and heart. The disease is usually a short and stormy one and there is no marked necessity for a high caloric intake. The effort should be to give these patients what food they can assimilate easily and of such a character as will tend least to the formation of gases. It is well recognized that the toxemia of the disease is indirectly responsible for the tympanites, but, at the same time, even if there be a toxic paresis of the bowels, the gas that forms must be made from something. Even in a severe toxic case, the tendency to distention may be modified by the character of the diet. Another factor worth considering is that if the patient has been accustomed to tea and coffee, this is not the proper time to deprive him of it and while often he may not desire it when ill, it is best that he get his usual amount of caffeine, preferably in the form in which he has been taking it. I have put coffee on the diet list of a child a year old, because the child had been accustomed to it and I did not think it a favorable time to discontinue it. A typical diet for the average case may be ordered somewhat as follows:

Water, fruit juices, tea, coffee, buttermilk, strained cereal broths, strained soups, malted milk (or similar food). The soups, such as pea, potato, celery and asparagus may be made with half milk or a fourth cream and some cereal (as rice or barley) cooked in it and strained. A fairly palatable and rather nutritious broth is made by boiling the bony parts of a chicken, (as the feet, neck, etc.) with rice for two hours, salt to taste, skim off the grease, strain and add one-fourth cream. Milk in this way is fairly well handled. Many do not find it of advantage to use plain milk in these cases. Sometimes, patients, particularly children, have a preference for some prepared food that they have used in infancy and the feeding problem may be largely solved in this way. Milk sugar may be used to advantage, very much as it is in typhoid. In any event the general condition of the patient and the ability to handle food should be carefully noted and the diet changed as indicated.

Routine Treatment.—There is no specific, and therapeutic measures are confined practically to general care and a symptomatic handling of the case. It may be said that the patient is cared for and not the disease treated. As will be developed in the following paragraphs on symptomatic treatment, from the moment that pneumonia is diagnosed or even suspected, effort is centered on conserving the circulatory apparatus and preventing abdominal distention. These and other considerations usually lead to the following routine:

Infinite attention to every detail of general care.

Carefully selected restricted diet.

Liquid petrolatum every night.

Castor oil in the mornings when needed.

Asofetida enemas when needed.

Large doses of citrates.

Aromatic spirit of ammonia when stimulation seems indicated.

The avoidance of morphine, atropine, strychnine and antipyretics.

Symptomatic Treatment.—Pain. During the early stage of the disease pain is sometimes such a factor as to necessitate active measures for its relief. The pain in the head and the general discomfort can usually be wholly relieved by the general care previously outlined. When medication is necessary codeine will usually meet the requirements. If a prescription is written the phosphate is ordered so that it can be more conveniently given by needle should it be found necessary. It is sometimes advisable to give a preliminary dose by hypodermic, but in the majority of cases about 1/4 grain (0.015 Gm.) by mouth, every two or three hours when needed, is all that is necessary. In the very early stage of the disease some use a few doses of acetylsalicylic acid, though this is open to criticism.

The pain in the chest which is the result of a secondary pleurisy may be quite severe. Many recommend the use of morphine by needle and at times it is necessary, but codeine usually meets the requirements sufficiently and does not have the unpleasant side effects that often result from the use of morphine. Intestinal elimination and the avoidance of abdominal distention are such important factors that the use of morphine is undesirable from this standpoint, at least. The chest pain can often be relieved to some extent by the position of the patient. Tight strapping should not be resorted to when it can be avoided, but the careful use of adhesive is very often indicated and may be of marked advantage. It should be left in place only as long as is actually required for the relief of pain.

Insomnia. As previously stated, the patient should be handled from the beginning with the idea of giving the maximum of rest and comfort. The restlessness and sleeplessness of the disease can usually be sufficiently relieved by the exclusion of all disturbing factors, such as business or domestic worries, noise and anxiety; and by the proper amount of fresh air, warmth, an ice bag to the head, proper diet, intestinal elimination, and the other measures indicated in general care. Where medication is needed, codeine will usually meet all requirements.

Cough. The cough in some stages of the disease is one of the conserving processes of nature and it is probable that in the sum total of treatment more damage than benefit is done by the efforts directed at relieving this symptom. Where the cough is of sufficient violence to interfere with rest or sleep or is productive of sufficient pain, it may be modified by the conservative use of codeine. The cough may also be markedly modified by the other measures that have been previously outlined, such as rest, fresh air, body warmth, etc. Hot drinks, or the frequent use of cold fruit juices are usually of benefit. Mustard poultices to the chest may here have a field of usefulness.

The cough may also be modified to a certain extent by the citrates, which I employ as a part of the routine treatment in all cases. Outside of hospital practice, they may be ordered as follows:

℞		or
Sodii Citratis,	℥j	30|0
Syr. Tolu,	f℥j	30|0
Liq. Potas. Citratis,	q.s. f℥vi	180|0
M.		

Sig.—Tablespoonful in water every 3 hours when awake.

This may be given conveniently in fruit juices.

Abdominal Distention. The matter of diet in this connection has been discussed in a preceding paragraph.

As a part of the routine treatment it is an advantage to use liquid petrolatum in doses of ½ to 1 fluidounce (15 to 30 cc.) each night throughout the course of the disease. In addition to this to use castor oil in the morning, when indicated. I find that I use an average of a dose of castor oil about every third day. Phenolphthalein or cascara may sometimes be employed to advantage. Calomel has been used for generations and may at times have a field of usefulness in this disease. The consideration is to keep up systematic modified intestinal elimination without violent purgation; and to have this elimination regular, and not confine it to occasional periods of severe and exhausting purgation.

Enemas should be used when indicated. Some cases seldom requiring this form of treatment, while in other cases they may be used to advantage several times a day. A satisfactory formula is ½ fluidounce (15 cc.) of the tincture of asafetida to ½ gallon (2000 cc.) of water. This does not irritate the colon and seems to meet every requirement.

The glycerine suppository has been employed often but usually is not as satisfactory as the enema previously mentioned.

Stimulation. Many drugs have been suggested for this purpose, particularly digitalis, strychnine, caffeine and camphor. It is the custom of some good physicians to give digitalis as a routine treatment, claiming that it is desirable to have the patient under the influence of the drug when the time of need develops, else it is then too late to hope to get the best results. It is possible that stimulants have been over used in the past, though this is a matter that cannot be established. The plan that I have employed for many years is not to use stimulants until they seem to be indicated and then to use aromatic spirits of ammonia in fluidrachm (4 cc.) doses every three or four hours, as apparently needed. If the patient presents a condition that definitely calls for digitalis (as fibrillation or flutter), it may certainly be used to advantage, but in the great majority of cases it is not required. It should be remembered that as part of the routine treatment, the patient is getting, in the form of tea and coffee, the caffeine to which he has been accustomed. The need of stimulation is probably largely influenced by the manner in which the case has been handled from the beginning. The necessity for stimulation should be judged not only by the pulse, the condition of the lungs, and the appearance of the skin, but by a careful consideration of the changes in blood pressure and the blood pressure-pulse rate ratio. This last finding, while it can not be absolutely relied upon as conclusive, is certainly of advantage in judging the condition of the patient.

Specific Serum. Extensive investigations have been made in recent years in this form of treatment. The present outlook is already full of promise particularly where the disease is the result of infection with the type I organism. In this plan, as soon as the diagnosis is made, the organism is typed and when its identity is established, if it is a type I organism, the specific serum is promptly administered. The reports so far have been extremely encouraging. Of course, a large part of the medical profession has not the facilities for carrying out the necessary laboratory work. Much has been tried in the way of using polyvalent serums. It should be remembered however that a serum reaction is a possibility, and that a patient who is on the threshhold may be pushed over in this way. Many valuable treatises, that give this whole matter in extensive detail are available and the student may well be referred to them for complete information.

Vaccines. As a prophylactic measure their value is still too unsettled to justify a definite statement. This matter is still in the experimental stage, but is certainly worthy of extensive investigation. In treatment many claims for and against have been made. The brilliant article recently presented by Lambert gives hope for much in the future.

Convalescence.—The tendency is to try to get the patient up and out too soon. The feeling among some seems to be that when the crisis has been passed, particularly when the lungs have cleared, that all is over. We should not lose sight of the fact that every structure in the body has been involved in this process, particularly the myocardium, and that there are few diseases in which the careful handling of the convalescent is more necessary.

The early employment of tonics may give the patient an artificial appetite and feeling of well-being that may lead to indiscretions. Tonics, if used at all, should be employed late.

There is little necessity for extensive feeding and usually the main difficulty is to prevent the patient from over-eating during the period of absorption particularly. It is best to increase the diet gradually as the tolerance of the individual is definitely established.

One eminent writer has recommended a month in bed, a month for getting the patient on his feet, and then another month of gradually increased exercise before he resumes his normal activities. Few patients can indulge in such a course, though some modification of this can usually be carried out. I feel that a minimum of ten days or two weeks in bed, after the temperature has reached a permanent normal, is certainly desirable, and that getting up and out should be a very gradual process and directed largely by the general condition and reaction to exercise. It is desirable that these convalescents avoid severe physical strain for several months, if possible.

The return to work is dictated largely by the condition of the patient, the necessities that obtain, and the character of the work. No general rule can be set down, but each case should be individualized.

BRONCHOPNEUMONIA

General Statement. **Definition.**—This is a disease characterized by inflammation of the smaller bronchial tubes and air vesicles composing a pulmonary lobule. The areas of involvement may be few or many. They are usually scattered throughout both lungs. though the process is ordinarily more pronounced in one side or in one particular lobe. Many of these small patches may unite to form a consolidation of appreciable size.

Many synonyms are used, such as catarrhal pneumonia, capillary bronchitis or lobular pneumonia. The disease differs from lobar pneumonia in bacteriology, pathology, and in the course and character of the manifestations. On the other hand there are so many points in common, that the two conditions are often considered together.

Incidence.—No age, race or condition is immune. This is the type of pneumonia attacking principally those in the very early and very late periods of life. It is naturally more prevalent during those seasons of the year when there are more acute respiratory infections, as fall, winter, and early spring. It is at times epidemic, particularly where large groups of people are together, as was so well illustrated during the late war.

Etiology.—Any one of a number of organisms may be responsible, such as influenza bacilli, streptococci, staphylococci, or pneumococci. The predisposing causes are very similar to those of lobar pneumonia, except that there is a larger tendency for this condition to develop from some other infectious disease, such as measles, whooping-cough or influenza.

Course and Prognosis.—As a rule lobar pneumonia runs a definite course, the symptoms increasing until somewhere between the sixth and ninth day when the condition ends, usually by crisis. In bronchopneumonia there is a greater tendency to irregularity; one day the patient apparently being on the road to recovery and the next showing a marked exacerbation of all unfavorable symptoms. There is no approximately definite period of duration as in the lobar type, and the usual course is a longer period of active disease and a more protracted and interrupted convalescence. While the termination may be by crisis, such is the exception. In this condition particularly, the prognosis is largely influenced by the age of the patient, by the preceding disease, where the pneumonia is secondary, and by the condition of the patient when the pneumonia develops. The mortality does not differ greatly from that of the lobar type.

Symptoms and Diagnosis.—No effort will be made here to discuss the subject in detail, but merely to emphasize the few differences of importance between this condition and the lobar type of the disease. For further details the reader is referred to page 100.

The history is more apt to give evidence of some preceding disease, such as measles, whooping-cough or influenza, with gradually increasing severity.

The onset is more likely to be insiduous, though of course it may be abrupt just as is so often the case in the lobar type. In a large percentage of cases, the patient first presents what seems to be, and probably is, a bronchitis. Instead of clearing up, this gradually increases in severity and it is usually difficult to say when the pneumonic process actually began. Some clinicians take the view that in all cases of severe bronchitis there are some areas of pneumonia.

The general symptoms from the standpoint of pulse, respiration, temperature, etc., are largely the same as those of the lobar type. As previously stated, the main difference is a tendency to fluctuations. The local symptoms as evidenced by chest examination are largely those of bronchitis, there being scattered rales of various types over the entire chest or a large part of it, though these may be accentuated on one side or in some particular area. The brick dust sputa of lobar pneumonia may be entirely absent. In many cases there is sufficient confluence of patches in some area of involvement for evidence of definite consolidation to be made out, though such are usually small. There is not the same tendency to pleurisy, though it may develop.

Prophylaxis.—The same measures would apply here as in lobar pneumonia. Particular care should be exercised in handling cases such as measles and whooping-cough, which are known to result sometimes in the development of the disease under discussion.

Treatment.—In my service at the Charity Hospital (male—white) I make no difference in the routine orders for the management of lobar and of bronchial pneumonia, and these cases are handled exactly alike except where definite indications arise to call for some variation in the routine orders. There are certain considerations, however, that should be noted; among these is the matter of ventilation. In the discussion of lobar pneumonia, I advocated the modified fresh air treatment in cold weather. This is particularly advisable in the bronchial type of the disease, and more care should be exercised in protecting the patient against exposure. In many of these cases the condition is largely a bronchitis and in all cases there is a more or less bronchitis that must be taken into consideration. To give these patients unlimited exposure in unfavorable weather does not seem to be a reasonable policy. This of course must be influenced to a certain extent by the degree of involvement, particularly as shown by dyspnea and cyanosis.

Many of these cases run a protracted course and at times show decidedly high temperature, and hydrotherapy in the form of sponge baths may be indicated.

Local Measures.—In bronchopneumonia there is very often a particular sense of tightness or constriction in the chest that sometimes amounts to a marked discomfort. This may at times be relieved by applications such as, mustard poultices which may be prepared as follows: one tablespoonful of mustard, eight tablespoonfuls of flour, and the white of one egg. This is mixed with lukewarm water and spread on thick cloth of sufficient size to cover one-half of the circumference of the chest. The face of the poultice is covered with cheesecloth or muslin. The cheesecloth side is applied to the front of the chest and allowed to remain until redness is induced, usually about twenty minutes. The patient is then turned over and the same application made to the back of the chest. Under no circumstances is any bandage or binder allowed to encircle the body, or any measure used that would restrict respiration. While an application of this kind would not be expected to modify the course of the disease, it does seem to give a certain measure of comfort.

Diet.—In the stormy period of the disease or where it runs a short course, the diet is the same as for the lobar type. In the protracted cases, the matter of nutrition becomes a factor of more importance, depending upon the condition of the patient. The same dietetic measures may be instituted as for a case of typhoid presenting the same degree of severity. (See page 263.)

Aside from the considerations just set forth, the various measures as recommended for lobar pneumonia usually apply in the bronchial type of the disease. See Acute Bronchitis page 83. Lobar Pneumonia page 101.

PLEURISY

General Statement. Definition and Classification.—Pleurisy is a disease characterized by inflammation of the pleura.

Many subdivisions are recognized. One is into: 1st, primary pleurisy, or those cases where the pleural infection is apparently not secondary to some other involvement; 2nd, secondary pleurisy, that is, where the disease develops as the result of some other process, such as pneumonia or tuberculosis.

Another grouping depends on the character of the exudate: 1st, dry or fibrinous; 2nd, wet or serous; 3rd, purulent pleurisy. (Hemorrhagic pleurisy is sometimes placed as a 4th group.) There are varying modifications of these, such as serofibrinous, seropurulent, etc.

There is a classification based on other characteristics, as diaphragmatic, interlobar, localized. A classification may be employed based on the infecting organism, as pneumococcal, streptococcal, etc.

Strictly speaking there is no dry pleurisy as in all cases there is a certain amount of exudate. In this article we will treat the subject of primary pleurisy without and with effusion, handling these as two stages of the same general condition; and pleurisy with purulent effusion will be considered under a separate heading. It is convenient to study the subject in this way for the reason that practically all of these cases begin as a dry pleurisy, showing the signs and symptoms of such. The disease either subsides at this stage or goes into the second stage of pleurisy with serous effusion. Fortunately, in the majority of instances, the picture closes favorably at this stage as only a relatively small number progress into empyema.

Incidence.—There is no group of humanity immune. It is more common in the fall, winter, and spring when the other acute respiratory infections are most active. Men are more often affected than women. The age of greatest susceptibility is early adult life. It is more common among the outdoor than the indoor workers.

Etiology.—A great majority of the cases of so-called primary pleurisy are the result of the bacilli of tuberculosis and are really secondary to an infection in the lungs. Very often the pleurisy develops before there are sufficient manifestations in the lungs to make the diagnosis of pulmonary involvement certain, but observation of many thousands of these cases by competent clinicians has determined the fact that sooner or later the majority show tuberculous disease. Many cases are the result of infection by other organisms, particularly the pneumococcus and streptococcus. In these instances the disease is often primary, though it should always arouse our suspicions as to the possibility of infection elsewhere.

Many predisposing factors are of importance. Some of these have been suggested under incidence. Other acute respiratory infections and exposure to chilling or inclement weather rather consistently appear in the history.

Course and Prognosis.—The cases of apparently primary pleurisy usually run a course of from one to three weeks of definite disability, most of them clearing up without evident damage, though more or less adhesions probably always form. Some develop serous effusion and a small percentage, pus. As previously stated, continued observation shows pulmonary tuberculosis in the majority of cases.

Symptoms and Diagnosis. Dry Pleurisy.—(Pleurisy without effusion or before effusion develops.)

Many of these cases are so typical that the diagnosis can be established without effort. In others the signs and symptoms may be so obscure that all of the data possible are required and even then doubt often remains.

History. In all cases a careful history should be taken for purposes of diagnosis, prognosis and treatment. Even if the diagnosis be perfectly established by the pain and friction rub, still the history is of value to determine the cause, the condition of the patient and to enable us to outline treatment and formulate a prognosis. Of particular interest is any evidence looking toward the possibility of tuberculous disease.

Onset. Pleurisy usually begins rather abruptly with pain, often with a chill, and in children there may be vomiting or even convulsions. Sometimes there is a prodromal stage of general discomfort, malaise, and loss of appetite, very much as in other acute respiratory infections.

Temperature. There is usually fever, though not often excessive. This is one of the points differentiating pleurisy from pneumonia, pleurisy usually not running a temperature of over 101 or 102. This lasts for a varying period of days, depending on the duration of the acute inflammatory process. If effusion develops, there is a tendency for slight, irregular fever to persist. In a mild attack there is little or no appreciable elevation of temperature.

Pulse. The rate increases out of proportion to the temperature; this is a diagnostic point of some value. This obtains particularly in those cases where the pain is sufficient to interfere with respiration and produce mental excitement and alarm.

Respiration. This is markedly embarrassed. The respirations are shallow to avoid the friction pain and there is a tendency to compensate for this by an increased rate. The respiration is also jerky in character, caused by the fact that a certain amount of movement usually takes place before pain is felt and the patient tries to stop the pain by abruptly checking the respiration.

Pain. In the average case of acute pleurisy without effusion the suffering is intense.

It is most often first felt in the anterior axillary line or just below and to the outer side of the nipple; though, of course, it may be felt in any part of the chest depending on the site of the inflammation.

The main characteristic that differentiates this pain from most others is that it is respiratory in character. When the patient holds his breath, pain largely or entirely ceases, to be experienced again when breathing is resumed. Also, pressure on the affected side, applied in such a way as to interfere with the respiratory movement, will lessen or prevent discomfort. This may be demonstrated by strapping the side affected, or for diagnostic purposes it is best done by firmly grasping the lower part of the chest with both hands, while the patient takes a moderately deep breath. Pain is usually relieved entirely when effusion develops, when the inflammatory process subsides or sufficient adhesions have formed. At times cases even with a loud friction rub feel absolutely no inconvenience; in these, the acute inflammatory process has subsided.

In diaphragmatic pleurisy the pain is more likely to be referred to other areas. The outer portion of the diaphragm is supplied by the lower intercostal nerves, and if this area is involved, the pain is often referred along the further distribution of those nerves in the abdomen. This may be particularly confusing, and many have been operated with the diagnosis of some abdominal infection, such as cholecystitis or appendicitis.

The central part of the diaphragm is supplied by the phrenic nerves and pain involving this portion of the pleura may be referred along the course of those nerves which are in relation with the phrenic nerve in its exit in the cervical plexus. This gives rise particularly to pain in the shoulder and scapular region. Not only may there be pain in those areas but also tenderness on pressure. Relief in this type of pleurisy is not obtained to the same extent by strapping or by manual pressure applied to the chest, but all measures have to include the abdomen in such a way as to support the diaphragm. Of course, in many cases more than one area is involved and the pain is referred to more than one of the regions suggested. Pain is caused not only by breathing but by any respiratory movement, such as coughing or speaking.

Tenderness. There may be tenderness on pressure though this is often not a marked symptom. A diagnostic point in pleurisy is the tendency of the patient to lie on the well side, as the pressure from lying on the affected side gives rise to pain. As will be suggested elsewhere, this is also a valuable evidence in the diagnosis of effusion, for the reason that when effusion develops, we find that the patient unconsciously begins to lie on the affected side, because the tenderness on pressure has been relieved and he is unconsciously trying to favor respiration.

Cough. This is almost a constant accompaniment of pleurisy. It is not usually as pronounced as in pneumonia and this is a diagnostic point of considerable value. The cough is painful during the inflammatory stage of the disease, the patient tries to prevent it as much as possible and seldom permits paroxysms such as are frequent in some other conditions. Some cough persists into the stage of effusion should this develop.

Physical Examination. On inspection the patient usually shows distress and evidence of pain, and a tendency to lie on the well side. Often the impaired motility of the affected side can be clearly observed. There may be some inequality of the pupils.

On palpation a friction rub often can be distinctly felt. Unilateral impairment of motion may be detected by placing the hands on various areas of the chest, or better still by placing the tips of the fingers of the two hands on the upper surfaces of corresponding ribs as high up in the axillæ as can be conveniently reached, with the palms and thumbs fixed immovable. When the patient breathes, there is a lifting up and rotating of the ribs under the finger tips and with a reasonable amount of experience, a relative impairment of motility may be noted with considerable accuracy. For example, on the well side a whole rib may glide under the fixed finger tips and the latter then rest in the next lower intercostal space during inhalation, to return to the original position during exhalation. On the diseased side the movement under the fixed finger tips will be less, possibly only a half or two-thirds of a rib's width. Palpation may show abdominal rigidity, particularly if the lower costal or diaphragmatic pleura is involved.

Percussion may disclose points of tenderness on the affected side. There is more or less impairment of the percussion note.

On auscultation a friction rub is the most commonly-found and conclusive evidence in the diagnosis of pleurisy. It may be heard throughout the respiratory movement, or only during certain phases of it. Auscultation also usually reveals evidence of impaired function on the diseased side, such as lessened respiratory and voice sounds.

Symptoms and Diagnosis of Pleurisy with Effusion.—When a patient has been observed from the beginning, or dry stage, an accumulation of fluid presents markedly less difficulty in diagnosis, but many of these cases are seen only after the stage of effusion has been reached; these may present many problems.

History. Of particular interest, of course, is information looking towards tuberculosis, pneumonia, or a preceding dry pleurisy.

Temperature. In this stage the fever is usually slight, having a tendency to be more irregular in type or entirely absent.

Pulse. This is usually rapid out of all proportion to the temperature and is a diagnostic indication of considerable importance. The pulse is particularly rapid if the effusion is on the left side.

Respiration. The rate may be much increased, particularly when the accumulation has been rapid. It is not so marked when the accumulation has been slow in developing.

Pain. The accumulated fluid separates the inflamed pleural surfaces and relieves the local pain, this is a diagnostic point of importance. When the fluid is absorbed or removed surgically, there may be some return of discomfort.

Cough. There is a tendency to a cough that is usually rather hacking in character, non-productive, and not usually violent, though any type may be encountered.

Physical Examination. Inspection reveals more or less fullness and comparative immobility on the affected side, particularly if the effusion is large in amount. A bulging of the intercostal spaces can often be noted. Particularly if the effusion has been rapid in accumulation, there may be dyspnea and cyanosis.

Palpation usually shows fullness and impaired motility of the affected side, and may reveal a comparative bulging in the intercostal spaces. Evidence may be found of misplaced heart or liver. One of the most valuable diagnostic points is the comparative lessening or absence of tactile fremitus.

Auscultation usually reveals a marked diminution of all respiratory and voice sounds in the area involved. Of particular value also is the peculiar quality of the spoken voice, transmitted just above the upper margin of the fluid (egophony). In some cases the sounds are so little impaired as to make the findings of auscultation misleading. This is true particularly in children but may be so in any type of patient. The coin test is sometimes of value, though even it may be misleading.

X-ray and Fluoroscope. These are invaluable aids in establishing the diagnosis and indicating the extent of involvement.

Prophylaxis.—There is nothing in a practical way to suggest. The prevention of pleurisy includes all measures looking to the avoidance of respiratory infection in general.

Treatment of Dry Stage. General Care.—No fixed rules can be laid down for the management of a case, but certain general principles of treatment will usually apply.

Rest. This should be absolute—both mental and physical. The ideal is to eliminate every factor that would make any demand on the respiratory function. Business cares and domestic worries must be excluded. Patients should be protected from the necessity of talking and as much as possible from coughing. They should be kept quiet in a comfortable bed, and warmly covered. An ice bag on the head will often prove of benefit.

Fresh air is essential. The effort is being made to lessen the respiratory movements by every means possible and the part that pure air can play in this is too well known to require discussion.

Intestinal elimination is necessary, but without subjecting the patient to the inconvenience and exhaustion of violent purgation. Not only does intestinal elimination have the advantages here that obtain in other diseases but, keeping the abdomen in proper condition, favors the action of the diaphragm. Mild purgatives are usually indicated and enemas should be used when necessary.

Food, in the early stages, should be very light, easily assimilated, and of a type that will not tend to abdominal distention. It is particularly desirable that the stomach should not be over-filled at any time. As the acute stage is usually short there is little necessity for trying to maintain a high state of nutrition. It must be remembered that anything that interferes with the function of the diaphragm is a distinct disadvantage, as the condition in the thorax throws a large burden upon this structure.

Strapping.—The one greatest measure for the relief of pain and for limiting the destructive processes is proper strapping of the affected side with adhesive plaster. It can be readily understood that where the opposing surfaces of the pleura at the site of the inflammatory changes are rubbing together, not only is pain produced, but the damage is perpetuated or even extended by traumatism; so that to lessen the friction as much as possible is the most reasonable way to relieve pain, limit damage, and promote cure.

When to Strap. Cases are found where the symptoms are so indefinite that a positive diagnosis is impossible and it is desirable to reexamine after a brief interval of time. Strapping here would practically do away with the possibility of a satisfactory examination, so if the damage is not sufficient to give an audible friction sound, and the pain is not of such severity as to require immediate action, it is sometimes advisable to defer strapping and use some other palliative measure, as will be suggested later. But as soon as the diagnosis is definitely established, strapping should be promptly applied.

Preparing the Chest. Before beginning the process the chest should be thoroughly cleaned and all natural or applied grease removed. This is probably best done with soap and water followed by ether. Any hair in the area to be covered should be carefully shaved. This contributes to comfort while the plaster is in place and renders its removal much easier. Not only should this hair be shaved, but it should be done carefully, for any damage to the skin in the process of shaving may favor irritation after the adhesive is applied, and enough trouble often develops even under the most favorable conditions. It is not necessary to shave the axillary hair, but care should be exercised that it is not caught by the adhesive. If this hair is long, it is best to clip it sufficiently to get it out of the way. Before proceeding the skin should be carefully dried, but never powdered.

Choice of Adhesive. There are many adhesive plasters on the market but all are not of equal quality. The physician should see that he has plaster of good standard make and it should be tested as to its adhesiveness before being applied to the chest. Not only is there a difference in the quality of the article as manufactured, but unless it is kept carefully it deteriorates.

How Applied. When possible, the patient should be in a sitting position, not humped up in bed, but sitting in an armless chair or on the edge of the bed, or standing and holding to something to steady himself, the purpose being to have the body line straight. In cases where the patient cannot rise to a sitting position, as in pneumonia, we have to carry out this measure as best we can, as will be described later.

It is hardly possible to apply adhesive properly by attaching one end to the patient and unrolling the plaster as it is carried around the chest. It is better to unroll a sufficient amount and putting the back of the plaster against the patient measure off the desired length, then cut this, and attach to some convenient object as the back of a chair. From this strip the others are measured and the desired number cut. One of the most important factors in proper strapping is to secure the cooperation of the patient in proper breathing, and it is often necessary to spend as much time in showing the patient how to breathe as in applying the plaster. The strips should be applied at the end of a forced exhalation. It is important that the arm on the affected side be held in the proper position, particularly if the strapping is to extend high up. It is not unusual, to see patients who have been strapped while the arm was lifted over the head and when the arm was lowered, the plaster not only did not fit or look well, but was actually uncomfortable. It is better to have the arm held at right angles to the body by an assistant, or to let the patient rest it on some object. After the operator has assured himself that he has the patient in the proper position and ready to coöperate, the end of one strap is applied to about the middle line of the body and the patient is told to exhale forcibly and then wait. While the chest is free of as much air as the patient can expel, the other end of the plaster is swept around the body and the two ends firmly held by the operator while the patient takes a few breaths. This is repeated until the strapping is complete. Strips about two inches wide are probably the best. These are overlapped when applied about one-half of their width, that is about one inch. It is usually more satisfactory to apply the strips from below, upward.

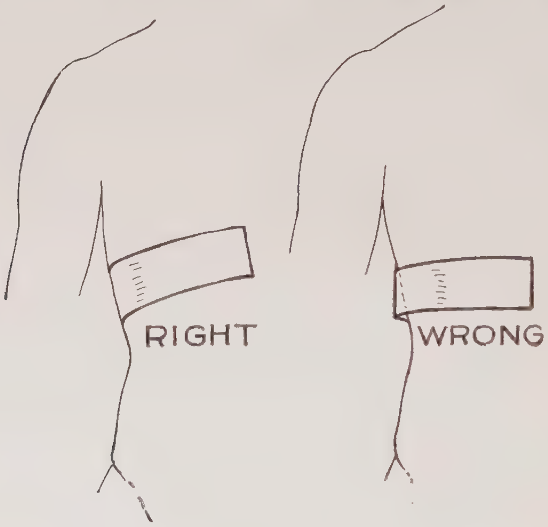

Fig. 2.

We are taught in minor surgery that in applying an ordinary bandage, as for example to the leg, not arbitrarily to carry the bandage in definite circles but to "follow the bandage." This contributes much to its properly fitting the part. Common bandages are more or less elastic, but adhesive is not, and yet we see patients strapped with the bandage arbitrarily carried around in a definite line, without any regard to the shape of the chest. This is particularly unfortunate for those patients with small waists. Under all circumstances, in applying adhesive to the chest, we should follow such a direction that the adhesive will lie flat. This is probably better shown by the accompanying illustration (Fig. 2) than it can be verbally explained. No matter how carefully the plaster is cut, there will be some uneveness of the ends and, if it is once applied and then lifted up from the skin, it will never stick again as well. The uneven ends not only detract from a neat appearance, but they are more apt to pull up and be uncomfortable; therefore, covering these ends with a vertical strip not only makes for a good appearance of the finished work, but lessens the tendency for the ends to pull loose, and contributes to the comfort of the patient. This is illustrated in Fig. 3.

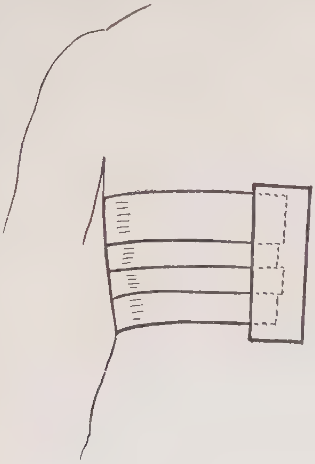
Fig. 3.

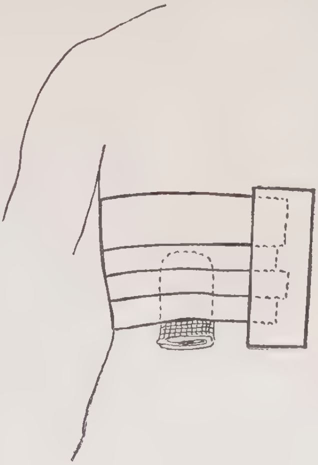
Fig. 4.

Special Considerations. Often these patients, before they are seen by the physician, have been subjected to various domestic remedies, such as irritant liniments, mustard plasters, or fly blisters and the skin thereby much irritated or even blistered. In such cases there are two measures that may be resorted to. One is to dress the damaged area, cover with gauze and strap over it. The gauze should project below the lower margin of the strapping so that any discharge from the area may drain out (Fig. 4). The other is to use palliative measures until the skin is in a condition where strapping would not be intolerable.

In strapping the chests of women the mammary glands may interfere if the adhesive has to be carried high up. Fixation under such circumstances is illustrated in Fig. 5. Beginning at the lower part of the chest the strips are applied until the mammary gland is reached, usually about three strips. Then one is applied above the mammary gland. Then one strip beginning above, in front, comes diagonally down to end below in the back and one beginning above, in the back, comes diagonally down to end below in front. These cross in the mid-axillary line.

Examination of Chest When Strapped. As an acute dry pleurisy is always a potential pleurisy with effusion, it is highly necessary to know when effusion begins to develop; therefore, careful and repeated examination should be made. One of the best evidences is the cessation of pain, but this cannot be relied upon entirely if the chest has been properly strapped. It should be remembered, in making this examination, that the affected side has been fixed in a state of forced exhalation. Therefore, all sounds will be abnormal as compared with the other side, which not only is unfettered, but is overworking to compensate for the side that is impaired. In this connection, it is well to remember that when the plaster has been on for sometime and is removed, an immediate examination will not give normal findings, for it takes some time for that side to return to its normal function.

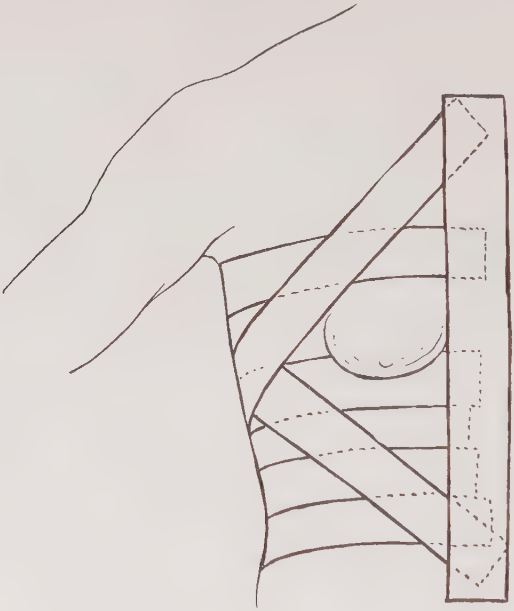

FIG. 5.

A certain amount of information can be obtained by examining while the side is still strapped, if these matters are borne in mind.

Auscultation gives very little information. Palpation is not of much advantage, but percussion can be relied on to some extent.

Where there is sufficient doubt, it is sometimes advisable to remove the adhesive, make the examination, and restrap if necessary. The findings on physical examination, the cessation of pain, and the clinical progress of the case, will usually give sufficient information if they are carefully interpreted.

How Long to Let the Strapping Remain. This must be dictated largely by the subsidence of symptoms, particularly pain. When the inflammatory process has sufficiently cleared for pain and friction rub to have disappeared, the value of fixation is at an end. This is usually about a week.

When sufficient fluid has accumulated to separate the inflamed surfaces, strapping no longer serves a useful purpose but is an actual disadvantage, and it should be promptly removed.

How to Remove. If the chest has been properly prepared before strapping and the skin has not been subjected to irritants, in a majority of cases removing the adhesive is a simple matter, unless, of course, it has been in place so long that a dermatitis has developed under it. Various methods have been suggested, but probably the best is for the physician to remove the plaster by merely lifting up the strips at one side and proceeding by succession of firm, steady pulls of two or three inches. It seems to be an advantage to double the plaster sharply back on itself in pulling, rather than lifting it straight out from the body. This is shown in Fig. 6. Stretching the skin tight with one hand as the plaster is pulled with the other is also an advantage. It should not be roughly jerked. The idea is not only to get it off with the minimum of discomfort to the patient but with the minimum damage to the skin. A long tub bath in hot water is said to lessen the discomfort. Sponging the back of the plaster with ether will make it to come off readily but this leaves a good deal of adhesive material on the skin.

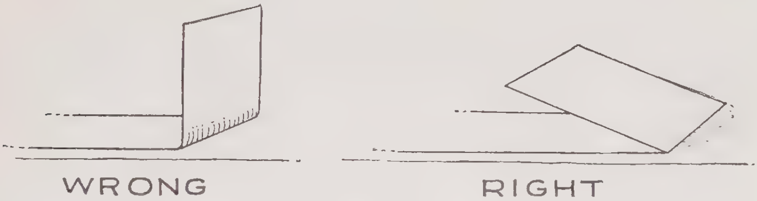

Fig. 6.

After Treatment of the Skin. It is always desirable to protect the skin as much as possible, because it is never known how soon it will be necessary to reapply. When the plaster is removed as suggested above, there is a certain amount of adhesive material left and it is better not to try to remove this at the time if the skin has been much irritated. At a later date it can easily be removed by the physician with ether, or gasoline or with melted petrolatum by the patient. Instead of removing this adhesive material at once, it may be dusted with talcum, which not only tends to relieve the discomfort from the irritated skin but prevents the adhesive material from sticking to the patient's clothing. This is a minor attention but one that should not be overlooked.

Other Applications for Relief. As previously stated, when the diagnosis of pleurisy is made adhesive plaster should be applied if there be no definite reason to the contrary. When the pain is not marked and there is no friction rub or when further examinations are desired, it is sometimes desirable to use other temporary measures in the way of applications. Probably the most satisfactory of these is a poultice of the type of the kataplasm of kaolin. If properly made an application of this sort has some tendency to limit the motion of the chest and possibly in other ways to contribute to the comfort of the patient. Under no circumstances should anything be used, like a binder, that will restrict the motion of the well side, and whatever temporary application is made, should not be of such a character as to irritate the skin and thus interfere with the use of adhesive plaster at a later date.

Medication.—There is no specific and in giving drugs it is with the following considerations in mind: To relieve pain; to promote rest and sleep; and not to interfere with digestion or intestinal elimination. The most useful agent is codeine. It fairly well meets the above requirements in the majority of cases when its action is reinforced by the other measures that have been outlined. In some cases the pain is sufficiently severe to require a preliminary hypodermic of morphine, but this is not often found to be the case. Codeine is best used by giving a preliminary hypodermic of ½ grain (0.03 Gm.) of the phosphate, then ¼ grain (0.015 Gm.) doses by mouth, every two or three hours when needed. Acetylsalicylic acid may be of value in this condition. It is usually given in 5 grain (0.3 Gm.) doses and may be combined with the codeine. In the early stages of the disease the possible depressing effect of the acetylsalicyclic acid is not altogether undesirable. It tends to reduce the activity of the patient and to lessen the local pain, headache, and backache, that are usually a part of the picture.

When there is an associated bronchitis or laryngitis, these, of course, should receive attention.

Treatment of Pleurisy with Effusion. General Care.—During this stage the measures of general care, as previously outlined, will be modified according to the condition as found. It is certainly desirable to avoid any tax on the circulatory or respiratory functions, and a maximum of rest and fresh air are always indicated. As the accumulating fluid begins mechanically to interfere with the respiratory function, fresh air becomes naturally a major consideration. The patient should avoid unnecessary talking, and coughing should be limited to the minimum that is necessary for the removal of the bronchial secretions. The patient should be kept as comfortable as possible, as will be discussed later.

Diet.—The following requirements must usually be met. Gastric and intestinal distention must be avoided by giving small, frequent feedings of easily digested food of a character that will not favor the formation of gas or leave much refuse. There must be an amount sufficient to meet the nutritional needs of the patient. It is probably best to avoid an excess of fluids and sodium chloride. The history of the individual as to digestive ability and the existing conditions, as fever and pain, must be considered. Among the foods usually of value are toast, butter, cream, milk, custard, well cooked cereals, soft-boiled eggs, and milk sugar.

Aspiration.—This is one of the most important measures for diagnosis, prognosis, and relief.

When to Aspirate. When fluid is found, if it is in sufficient amount to be a menace to the integrity of the lung and the patient's well-being generally, immediate measures should be taken to remove it. When the fluid is not in sufficient amount to require prompt removal, it is best to note the apparent level and to wait, examining the patient every day or every second day, and instituting such measures to favor the absorption of the fluid, as will be detailed later. If, in spite of these, the fluid continues to increase in amount, it should be removed. If the level remains stationary and there is not sufficient to be a menace, it is best to wait a reasonable time, keeping the case under proper observation, and to aspirate only after being convinced that absorption will not take place. If on the other hand the fluid shows a tendency to diminish, under observation, it is certainly best not to interfere.

Watching the Amount of Fluid. After the apparent level of the fluid has been determined, the line should be carefully noted in the records of the case. This can usually be done by selecting some landmark on the patient's skin. For example, say a certain distance above or below some particular mole or scar; or, if no mark is available, a rib or spinous process can be used. Re-examination should be made every two or three days, being careful always to have the patient in the same position, and any change in the fluid level noted. It is always best to verify these findings with the eyes shut, as otherwise we may be influenced in our judgment. In every instance the line should be established by palpation, percussion, and auscultation. Palpation for this purpose is best carried out by having the fingers slightly spread but parallel and having only the surface of the fingers applied, the palm of the hand not touching the body. The fingers should be placed first well up in the area of the normal fremitus and, as the patient speaks, the fingers are lowered each time a short distance. It will soon be noted that the lowest finger has passed into an area of lessened or absent vibration, then the next finger, until only the upper finger is in the area of unimpaired fremitus. The advantages of this are first, the spread fingers do not transmit vibration to each other as readily as if they were in contact. Second, the lessened vibration in the lower fingers is accentuated by the presence of it in the others. It is probably best to have the little finger uppermost, as the ulnar nerve is more sensitive to vibration than are the nerves supplying the other fingers.

Aspirating Outfit. After trying the various outfits on the market and meeting with a varying degree of success and disappointment, I at length assembled the following apparatus:

A 20 cc. Luer syringe. This will fit the ordinary hypodermic needle and the plan is to have all connections uniform.

A Potain aspirator with one extra stopper and two 1000 cc. graduated bottles. These bottles are squat, with heavy flat bottoms to prevent their being turned over. All regular Potain connections on this outfit are replaced by those of the Luer type. All needles and cannulas are made to fit Luer connections. A distinctive feature of the trocar and cannula used in this outfit is that the trocar fits snugly into the cannula and the cannula is so constructed that it does not present an appreciable shoulder at the end that is introduced; that is, coming back off of the trocar onto the cannula, it does not present any obstruction to its insertion into the tissues. This is probably best shown in the exaggerated illustration (Fig. 7). The No. 13 trocar and cannula is the one employed.

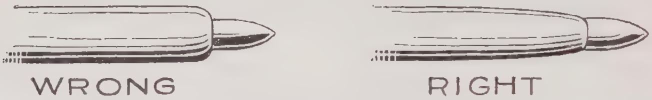

Fig. 7. (Enlarged illustration.)

The advantages of this outfit are many. When the trocar and cannula have been introduced and the trocar removed, suction can be made through the same cannula by either the Luer syringe or the Potain outfit. As is well known, the suction bottle does not exert enough force to remove thick fluid, while the Luer syringe can exert the maximum of force. Then, if for any reason the cannula becomes stopped, as it often does by plugging with pus or fibrin, the Luer syringe containing a small amount of air can be attached and the cannula opened by forcing the air through it. The extra graduated bottle and Potain stopper are convenient for use if more than one bottle (1000 cc.) of fluid must be removed. Air should be removed from both bottles and the stopcocks turned before beginning the aspiration. When the first bottle has been filled the second can be attached while the first is being emptied, the foam rinsed out and air removed preparatory to further use. It should be an inviolable rule whenever an instrument is introduced into the chest for the removal of fluid, whether for diagnostic purposes or for treatment, to have the entire outfit ready and remove at that time, if fluid is found, the necessary amount. It certainly seems decidedly inadvisable to introduce one instrument for diagnostic purposes and, finding fluid to have to introduce another for therapeutic measures. I do not use a needle under any circumstances for this work. The trocar and cannula as shown here can be introduced almost as easily as a needle of sufficient caliber to meet the requirements and I prefer the trocar and cannula for the following reasons:

A needle is more apt to become plugged in being introduced. I have known careful operators who made it a rule to first make a stab wound with a small knife and then introduce the needle, claiming that it lessened the tendency to plugging with tissue.

A needle is more apt to injure the intercostal artery.

A needle is more apt to penetrate the lung. In removing abdominal fluid, we do not use a needle for fear of entering the intestines. The same danger of the possibility of damage applies here.

If the fluid is not found at first, it is often desirable to move the instrument in various directions and this can be done with less danger by a blunt cannula than can be done with a sharp needle.

The needle is more apt to injure the visceral pleura during the process of the removal of fluid. No matter how carefully an instrument is introduced, it naturally must project beyond the chest wall into the fluid and, as the fluid is removed, the lung approaches the chest wall until finally with the respiratory movement it drags across the point of the instrument. A smooth-ended cannula is certainly less apt to do damage than a sharp pointed needle.

A needle cutting the visceral pleura may produce a site of lowored resistance that will favor the growth of infectious organisms and lead to the formation of pus.

There is the greater danger of a needle cutting through into the lung substances, causing hemorrhage or letting in the bacterial flora of the bronchial passages or even producing a pneumothorax.

I can remember that as a student in hospital work we rather expected as a matter of course that towards the close of aspiration the patient would complain of pain; that the last of the fluid withdrawn would be bloody; and that at subsequent operations we might find pus. All of these chances are lessened by the use of a properly made trocar and cannula.

How to Aspirate. Patients should be mentally prepared, as far as is possible, for the operation. In fact the word "operation" should be avoided, and the patient impressed with the fact that it is not to be painful or dangerous. He should be put in the best possible position to favor the measure. This will depend, of course, on the condition of the individual. The most satisfactory position is for him to sit up in bed, with the shoulders drooped forward as this separates the ribs as widely as possible. The arm on the affected side is best carried forward and across to the opposite shoulder. The patient otherwise is made as comfortable as possible. It is always desirable to have someone to support him in the proper attitude. If he is too sick to justify sitting up, he should lie on the well side with his back to the operator and, reaching up with the upper arm, grasp some firm object, as the head of the bed. In any event he should always be placed where he can lie down immediately should it be necessary.

The exact point at which to introduce the instrument will have to be determined by the level of fluid. Usually the best site is just below or a little to the outside of the lower angle of the scapula. If the accumulation is circumscribed, we will, of course, have to be directed by its location.

The skin should be thoroughly cleaned and painted with tincture of iodine. A superficial and deep local anesthesia should always be employed. This contributes to comfort, secures better coöperation, and lessens the chance of shock. Procaine (Novocaine) is usually selected for this purpose. It is sometimes desirable to give a preliminary hypodermic of morphine and atropine. When sufficient anesthesia has been secured, the trocar and cannula should be introduced, holding it as close to the top of the rib as possible in order to avoid the intercostal artery; in fact, it is desirable to introduce the instrument through the skin against the upper part of the rib, then to lift it and glide it over the top into the pleural space. This has the advantage of not only avoiding the artery but favors the closing of the opening when the instrument has been withdrawn. When the instrument has been introduced, the trocar is removed. Very often, if the fluid is serous, it will immediately start flowing. The Luer syringe can then be attached and a sufficient amount removed for examination, and this transferred to a sterile container. The Potain apparatus is then attached to the cannula and the proper amount of fluid removed. If the fluid does not come through the cannula when the trocar is removed, the Luer syringe should be attached and suction made. If the fluid is found to be sufficiently thin, the operator can remove enough with the Luer syringe for diagnostic purposes and then attach the Potain suction outfit. If the fluid when drawn by the Luer syringe is found to be too thick for the Potain apparatus, the Luer syringe can be used to remove as much of the purulent matter as is possible or desirable. This is of particular advantage now, when it is considered undesirable to resort to early surgery, as was formerly done. If the fluid is found to be of such a character that surgery is necessary, at least enough can be obtained for diagnostic purposes.

How Much Fluid to Remove. In serous effusions the amount that should be removed by aspiration will depend on many conditions. Where the effusion is right sided, it is usually desirable to remove as much as is possible. Where the effusion is left sided particularly if the heart has been much displaced, it is safest to be more conservative. In any event it is necessary to be guided by the condition and reaction of the patient. It is best, whenever possible, to make frequent blood pressure readings throughout the operation and a marked fall in blood pressure would indicate a suspension of the measure. It should also be stopped should the patient develop unfavorable symptoms, such as palpitation, vertigo, cyanosis, dyspnoea, nausea, or any other evidences of cardiac embarrassment or shock. It is always impossible to remove all of the fluid present and we know that in a large per cent of the cases, if a reasonable amount be removed, nature will take care of the rest.

Absorption of Fluid. As previously suggested, nature is often able to take care of the effusion, and this seems to be particularly the case if enough of it has been removed to lessen the pressure.

Measures to Promote the Absorption of Fluid. This is a matter that is often neglected. It is possible that certain measures will favor the removal of pleural fluid just as they will the removal of those elsewhere in the body. These would apply both to the stage of the disease before aspiration was deemed necessary and to the removal of the remaining fluid after aspiration.

Rest is certainly one of the important considerations. If properly carried out it lessens the work of the heart and the respiratory apparatus. It should be both mental and physical.

Restriction of Fluids and Salt. It is probable that some benefit can be obtained by moderating the fluid and salt intake. The diet, of course, should be such as to carry sufficient nutrition to meet the requirements of the individual but not to tax the digestive ability. Tea and coffee, if the patient is accustomed to them, are desirable for their stimulating and diuretic qualities.

Elimination. In addition to the usual requirements in disease, there may be some value in the employment of hydrogogue purgatives. These should not be used to the extent of exhausting the patient. Concentrated solution of magnesium sulphate is one of the best agents. The patient should be kept warmly clothed and covered to favor the function of the skin. Diuresis can be moderately encouraged by tea or coffee or other medical measures, in certain cases particularly, by digitalis, which is also of value otherwise.

Stimulation. In addition to tea and coffee, as previously mentioned, moderate doses of digitalis and strychnine seem to be of advantage in some cases. In the use of these we should of course be guided by the general condition of the patient.

Other Measures of Treatment.—Many other measures have been suggested in the treatment of pleurisy with effusion, such as counterirritation and autoserotherapy.

After-care of the Pleurisy Patient. It has been definitely established that a majority of the cases of so-called primary pleurisy are tubercular in origin. It is best not to burden the patient or the family during an acute attack with any detailed discussion of the probable background, but at the proper time and after a suitable mental preparation of those concerned, it is advisable to give them a plain talk as to the probabilities. It should be the inviolable rule to treat all of these cases as incipient pulmonary tuberculosis. This can certainly do no harm and is usually productive of much good. There are two important measures to be instituted: one is continued observation, and the other is attention to the general condition of the individual. It is a good rule to arrange for a thorough examination about every three months, for at least three years, unless some indication arises that renders more than this advisable. At these periods of investigation, the physical findings should be noted and recorded, and a temperature record of several days made. The patient should be instructed to report for investigation promptly upon the appearance of any suspicious symptoms, such as fever, cough, or loss of weight.

EMPYEMA

General Statement. Definition.—Empyema is an acute or chronic process characterized by pus in the pleural sac. It has been called by many other names, such as purulent pleurisy or purulent pleuritis. It is common also to classify according to type, as general localized and interlobar.

Incidence.—Any age, race or type may be affected. It is very frequently found in childhood and it is highly probable that many cases are overlooked. It is, naturally, more common in that period of the year when acute respiratory affections are most prevalent, that is the cold season.

Etiology.—The exciting cause is always bacterial. Among the more common of these are the pneumococci and streptococci, but various others may be responsible for the condition. The great majority of these cases follow either pneumonia or common pleurisy. The disease also may be apparently primary or may result from such conditions as wounds in the chest, bone disease, pulmonary tuberculosis, or pulmonary abscess.

Course and Prognosis.—While it is undoubtedly true that many cases subside without treatment, and many others as a result of aspiration, the tendency is for the condition to persist until more radical surgical measures are employed. The question of surgery is not so much as to whether it will be necessary as to when. In the unrecognized case or the imperfectly treated one, the usual course is either to progress with gradually extending damage, finally rupturing externally or, more commonly still, to develop into a low grade septic process that gradually undermines the vitality of the individual. For several reasons the prognosis now is more favorable than at any time in the past. First the disease is recognized earlier and with more certainty by the use of modern methods of investigation, and the circumscribed areas more definitely located. Second—the present plan of treatment is better. The usual causes of death are septicemia, pyemia, and exhaustion. The extensive deformity that was so often found as a result of this disease in past years is now largely prevented.

Symptoms and Diagnosis. History.—Of primary importance is a history of some preceding condition known to be a factor in the production of this disease, such, for example, as some other type pleurisy, pneumonia, pulmonary abscess, tuberculosis, bone disease or chest wound. An occasional cause is subdiaphragmatic abscess.

Onset. This may be gradual or sudden. When the disease follows pneumonia, there is apt to be a period of comparative well-being following the crisis, then a rise in temperature and the development of other symptoms that show a tendency to persist. When the disease develops from a primary pleurisy, it may be evidenced as an exacerbation of symptoms that have been present, or may appear only to be a pleurisy of particular violence, where the high temperature and prostration, show a tendency to persist.

Fever. The temperature is usually high, particularly in the early stages. Later the tendency is to the septic type.

Chills. There may be distinct chills or only a sense of chilliness, these may be frequent, at irregular intervals, or of the afternoon type.

Sweats. These may follow the chill in the usual order or the patient may show a tendency only to typical night sweats, such as are so frequently observed in tuberculosis.

Pulse. The rate usually goes beyond that to be expected from most other pathological processes, particularly where the accumulation is large, and more especially if it be on the left side. If this condition persists to the stage of prostration, the pulse naturally develops changes in rate and force.

Respiration. Like the pulse, respiration is affected not only by the temperature and toxic process, but often by the presence of the accumulated material, mechanically interfering with the respiratory function.

Pain. There is the usual general discomfort of a toxic febrile process, such as headache and general body pain. There may or may not be pains in the chest, depending upon the location and character of the involvement.

Nervous Phenomena. Several factors tend to disturb the nervous balance, such as pain, toxemia and interference with the respiratory function. The result is a tendency to restlessness, irritability, insomnia, or the mental dullness of a state of prostration.

Gastro-intestinal Symptoms. There may be anorexia, nausea, vomiting, flatulence, constipation or diarrhoea.

Prostration. The tendency is to prostration, loss of weight, and the other manifestations of a severe toxic condition.

Physical Findings.—As previously stated, these are largely the same as those of serous pleurisy.

Inspection. In the small localized accumulation, there may be nothing characteristic. In the general type of the disease, particularly if the quantity of purulent material is large, there are the usual evidences of a pleural accumulation, such as comparative fullness, impaired movement and bulging interspaces on the side involved. This is more marked in purulent than in serous accumulations. There is a tendency also to edema of the surface. The pulsating type naturally shows the characteristic impulse transmitted from the heart.

Palpation. The usual findings of the serous type of pleural accumulation are rather increased, particularly the bulging interspaces. Surface edema may also be found in some instances.

Percussion. The findings are largely the same as in pleurisy with serous effusion.

Auscultation. The usual evidences of fluid may be accentuated when the material is purulent. There is a more complete elimination of respiratory and voice sounds, due to the fact that they are not transmitted as well through purulent as through serous material.

Exploratory Puncture. This is the only certain diagnostic measure and should be used early in all cases of suspected fluid, particularly if the other evidences indicate that it is purulent. When this is done, everything should be ready to remove by aspiration the fluid found, if it is of such a character as to admit of its being withdrawn in this way. A specimen should always be submitted to the laboratory for investigation and report.

X-ray. This is of value in so large a percentage of cases as to call for its routine employment.

Laboratory. Aside from the investigation of fluid when it is withdrawn, the laboratory examination is of advantage both in diagnosis and prognosis. The blood, naturally, gives an increased total white and neutrophile count. Later in the disease, there may be more or less marked anemia. The urine shows nothing characteristic, although there is a tendency to albumin and casts.

Differential Diagnosis.—The principal conditions to be differentiated are serous pleurisy, pneumonia, tuberculosis and pulmonary abscess. The careful evaluation of the data accumulated from the symptoms, physical findings, x-ray, and exploratory puncture, usually enables a careful observer to establish an early diagnosis.

Prophylaxis.—There is little of value that can be urged. The first consideration is the prevention of those conditions that lead to this particular disease, such as pneumonia, tuberculosis and the other types of pleurisy. When these conditions do develop, prompt and careful attention to them tends to lessen the chances of empyema's developing. It is probable that a frequent cause of empyema is faulty technique in making exploratory punctures or aspirating for the relief of serous pleurisy, the infection being carried in by the needle or let in from the lungs by trauma.

Treatment.—One of the principal considerations is an early diagnosis, as promptness is invaluable in the proper management of this condition. There is no specific medication, and treatment may be divided into general care, relief of symptoms, aspiration, surgery, and the management of convalescence. It should be borne in mind that the patient is probably in for a protracted siege and that there is always the possibility of the involvement of other structures by direct extension, septicemia or pyemia.

General Care.—The facts stated in the preceding paragraphs should be remembered in planning and carrying out the general care of the patient. Absolute rest is essential. This should include not only rest in bed, but freedom from noises, excitement, domestic or business cares; in fact, everything should be eliminated that would cause any increased demands on the circulatory or respiratory functions.

Treatment Quarters. A room should be selected that will meet the requirements of perfect rest and quiet, also be adequate as to heat, light, ventilation and convenience of nursing. As in all cases of disease of the respiratory apparatus, fresh air is essential. Gas or oil heaters must not be used.

Nursing. In this condition the patient not only requires a great deal of ordinary attention, but there are many possibilities in which trained attendants may be especially desirable. In the private home, it is often necessary that the physician have capable help in carrying out the measures that will be necessary.

Bathing, Etc. The patient should have the usual daily cleansing bath. Hydrotherapy may be employed for the relief of high temperature. During the febrile period, an ice bag should be employed to the head and the hot water bottle or electric pad may be used as required.

Bowels. As in all cases of disease of the respiratory apparatus, it is particularly desirable to maintain proper elimination, as abdominal distention interferes with respiration. Violent purgation should be avoided, but sufficient activity maintained by the use of mild laxatives and enemas if needed.

Diet.—During the period of high temperature, the diet should, naturally, be carefully restricted. It must be remembered, however, that the patient is facing a long period of sickness and one that has a marked tendency to make demands on the body resources; it is imperative, therefore, that the nutrition be kept at as high a level as the condition of the patient will permit. The diet may be very much like that of typhoid fever (see page 263). It should, be changed if indicated by the development of gastrointestinal or other unfavorable evidences.

Symptomatic Treatment. Pain. Codeine is probably the most satisfactory agent and should be used in sufficient amount to meet the requirements. Marked discomfort is not often of long duration and pain is not usually a very troublesome symptom.

Nervous Phenomena. Here again codeine is probably one of the most satisfactory agents to employ, as it relieves the discomfort with a minimum of unsatisfactory side effects. At times the bromides or barbital may be used to advantage.

Fever. The general care of the patient, such as rest, baths and elimination, will usually meet the requirements. An ice bag to the head is of advantage and hydrotherapy may be used when indicated.

Gastro-intestinal Symptoms. These may be largely controlled by proper attention to diet. For nausea and vomiting, the bromides in 15 to 30 grain (1 to 2 Gm.) doses usually give relief. Before medication is employed, simple measures such as crushed ice, small amounts of carbonated drinks and fruit juices should be given a thorough trial. Flatulence, as previously suggested, may be relieved by proper attention to diet, by mild laxatives, such as liquid petrolatum, and by the use of enemas. Other symptoms that develop should be handled as the same conditions arising from other causes.

Removal of Fluid.—Aspiration has been discussed in part under the head of diagnosis. Until recent years, it was the custom to resort to some radical measure, such as resection, as soon as the presence of any pus was established. The present tendency is decidedly against early recourse to such measures. This was particularly borne out by the experience of many competent observers during the unusual opportunity offered for the observation of large groups of cases in the world war. It seems an established fact that the best plan is, when fluid is found if it can be removed by aspiration to do so, and continue to remove it in this way until the condition subsides or the material becomes too thick. The patient can be put in a better general condition for operation should it be necessary later, and nature has had an opportunity to construct barriers that render the operative measures safer and more certain to give satisfactory results. In many cases the removal of a section of rib or preferably, drainage through an opening between the ribs becomes necessary. Excellent results are being obtained by irrigation through a drainage tube inserted through an opening between the ribs.

Management of Convalescence.—The measures to be pursued must depend largely upon the condition of the individual case. It is certain that fresh air, sunlight, and a highly nutritious diet are always indicated. Activity should be delayed until it is reasonably certain that it is safe, and then carefully supervised. In favorable weather these patients should be carried out in the open air and sunshine, care being taken to give proper protection by clothing or covering. During convalescence, the possibility of further trouble must be remembered. This may result from involvement of other structures or by improper drainage, some pocket of pus becoming isolated in the healing process. The case should not be discharged until repeated examinations have demonstrated that no vestige of the infection is left, and that the individual has functionally recovered.

Complications.—The principal complications to be suspected are pyemia and septicemia, with their many possibilities of further trouble, particularly endocarditis.

HAY FEVER

General Statement. Definition.—Hay fever is an acute rhinitis caused by the inhalation of the pollen of various plants. Many different names have been given to this condition at various times and places, such for example as rose cold, autumnal catarrh, pollen coryza, pollenosis and hyperesthetic rhinitis. It is probable that the last two of these are really the most logical names for the condition. Pollenosis, of course, is applied to any condition resulting from contact with the offending pollen, and the term hyperesthetic rhinitis must include reactions to other irritants as well as pollen. We use the term hay fever because it is so commonly understood and while it is not correct either from the standpoint of cause or as indicative of febrile reaction, it is convenient as a designation until there is more uniformity in the nomenclature of this disease.

Incidence.—Practically persons of all ages and conditions may be affected. It is rather hard to make a statement as to the comparative prevalence from the standpoint of sex. It is particularly a condition of active adult life, though fairly young people and old people are not entirely immune. The condition is naturally more prevalent in some localities than others; this depends upon the presence in these places of plants that are most apt to produce the reaction. Some sections, as the White Mountains, enjoy a comparative immunity. It has been claimed that the condition is more apt to appear among brain workers than other classes.

Etiology.—The direct cause is the pollen of certain plants. It is highly probable that all of these that may cause this condition have not yet been studied. Among the most common, however, are the grasses, such as June grass, orchard grass and timothy, which produce the spring type; and ragweed which is the most common cause of the fall type; this applies particularly to the southern part of the United States. Many other plants, too numerous to mention, have proven to be the offending factors in certain sections of the country, particularly in individual cases. It is probable that golden-rod which has been so universally blamed in the past is seldom a cause of trouble. If we consider here the whole group of symptomatically related conditions covered by the term hyperesthetic rhinitis, there must be added many other etiological factors such as the emanation from animals and the dust of various substances such as wheat flour, though these are more apt to produce asthma than rhinitis. Bacteria sooner or later play a part in many cases though acting more in the way of a predisposing cause or a complication.

Among the predisposing causes, heredity is of most importance. In a large percentage of cases an hereditary tendency to hyperesthetic rhinitis, or some similar condition, such as asthma or eczema, will be found. It is not unusual to find family after family where one or more members will present one or more of these various conditions. For example, I have under observation now one family where the father has eczema; one of the children has eczema; one has eczema, asthma and hay fever; and one has hay fever.

An individual may be susceptible to a single pollen or to many, and there seems to be a tendency toward a progressing sensitization; for example, one may begin with a spring attack and later develop the fall type also, and finally a condition continuing throughout the entire season.

Various observers have claimed as predisposing causes many conditions such as gouty diathesis, etc. These are still open to question. In my own experience I have been unable to trace any connection between the general physical condition and the susceptibility to the disease.

It is certain that sensitization is an essential factor in the disease, as to the whys and wherefores of the sensitization, much is yet to be established. Another predisposing cause that is often given is an abnormal condition of the nares, such for example as enlarged turbinate bodies or deflected septum. Here again there is a question, as it is common to find individuals with abnormal nasal conditions apparently entirely immune, while many others are victims of the disease who present no appreciable deviation from the normal in this respect.

Many cases are found where the trouble followed some surgical measure. I have under treatment now one case where a polysensitization followed tonsillectomy and one where it developed after an operation for a deflected septum. In neither case is there any history of a preceding trouble even of a related nature or any familial predisposition.

Course and Prognosis.—True pollenosis runs a self-limited course, beginning with the exposure to the offending pollen and subsiding when the particular plant or plants cease pollenation. The sensitization once acquired shows a marked tendency to persist. In some rare cases the condition subsides without treatment, in other cases it persists in spite of all efforts at relief. The most unfavorable phase of the prognosis is that the hay-fever case of today is a potential asthma patient for tomorrow, and may develop some of the other kindred conditions at any period in the future.

Symptoms and Diagnosis.—There is seldom much difficulty in establishing a diagnosis as to the presence of the disease. The main object of an investigation is to ascertain the particular cause, in order that the patient may be desensitized or removed to a more favorable environment. These matters were discussed in considerable detail under the head of asthma, page 140.

History.—Of primary importance here is the matter of heredity. Establishing the fact that other members of the family are susceptible, goes far toward establishing a diagnosis, and very often may give information of value as to the cause, as there is not only a family tendency to the condition as a whole, but often to a particular type. The matter of periodicity is, of course, the principal link in the chain of diagnosis. A condition that begins at the time of the pollenation of certain plants and uniformly subsides with the cessation of this process, can admit naturally of no other diagnosis. Of importance here from the standpoint of establishing the definite etiological factor is the particular period of the year during which the patient is affected. Only those plants may be considered that pollenate during that season. For example, where the attack does not begin until the middle of

August, the many plants that pollenate during the spring would be excluded, and we would look only to those that begin about the middle of August.

General Symptoms.—Among these might be mentioned a feeling of general malaise and discomfort and sometimes restlessness or other nervous phenomena. There may be headache and at times some febrile reaction. After the attack, is established sleep may be much interfered with, as well as appetite and digestion. A symptom that has seemed to be very frequent is a lowered intellectual efficiency. There seems to be an inability to concentrate and some impairment of memory. This may be largely or entirely due to the local discomforts and the frequency with which the mind is called from its normal functioning by interference with normal respiration and the various other inconveniences.

Local Manifestations.—There is not much regularity in the sequence of symptoms and no effort will be made to give them in the order in which they may be expected. One patient seldom presents all the various phenomena and any one of these may be more accentuated in one case than another. There is usually a profuse nasal discharge, thin at first, later it may become mucoid or mucopurulent. It is often irritating in character, tending to produce excoriation of the skin with which it comes in contact; much of this discomfort, however, is probably the result of the constant use of handkerchiefs. There is a marked turgescence of the nasal mucous membrane which at times may entirely prevent breathing through the nose. Sneezing is a fairly constant symptom and may be of considerable violenee, sometimes leading to headache, conjunctival hemorrhage, and soreness of the muscles of the chest and abdomen. Sneezing is usually rather paroxysmal in character. There is usually considerable involvement of the conjunctiva with more or less itching, particularly of the inner canthus, and persistent lacrymation; there may be photophobia. There is usually much discomfort referred to the posterior nares and nasopharynx. The patient often complains of a sense of itching and discomfort that is described as being "deep in the ears," probably resulting from involvement of the eustachian tubes. There may be discomfort in the external auditory canal, retraction of the drum, and even impairment of hearing. There may be itching of the skin of the face and even other areas of the body. There is often a sense of acute discomfort referred particularly to the bridge of the nose. A rather peculiar condition sometimes encountered in those patients that have both hay fever and asthma, is that during an attack of asthma the rhinitis subsides and respiration through the nose may be carried on with perfect comfort.

Skin Tests. This depends upon the sensitization giving rise to a local reaction when a solution of the offending pollen is brought into contact with an abrasion on the skin, or injected into the skin. This is of particular importance in establishing a diagnosis as to the definite cause of the disease. The various pollens that may be incriminated by the history as, for example, ragweed in the fall type of the disease, should be employed. The manufacturers put out preparations for these tests. This process of investigation should always be carried out, but the findings may be misleading, particularly in the hands of the inexperienced. The results should not be accepted as conclusive, they should only be considered in connection with all other available data.

Examination. Physical examination reveals only the conditions that must be expected from the symptoms, that is, all the characteristic findings of an acute reaction of the mucous membrane of the involved structures.

Prophylaxis.—The prophylactic measure of most value is the eradication from a community of those plants that are known to produce the disease, where such is possible. This should be particularly easy in the matter of ragweed, as it is a plant that serves no useful purpose and is one that can be easily recognized. It should be borne in mind, however, that pollen can be carried for a considerable distance, therefore, this extermination would have to cover a wide area. The maintaining of an excellent state of general health has no value here. The measures directed to nasal pathology will be discussed under the head of surgical treatment. Desensitization in advance will be discussed under specific treatment.

Treatment.—Marked strides have been made in recent years in the handling of this disease, but much yet remains to be accomplished.

General Care.—There is very little of importance to suggest in regard to the general management of the case, as diet, living conditions, clothing, etc., exercise very little, if any influence, and the only measure of material advantage is the avoidance of exposure. In a large percentage of cases a change of residence is impracticable and the individual prefers to endure the inconvenience of the disease rather than the inconvenience of a change of location. Another factor that should be borne in mind is that it is inadvisable to move to any particular place until the advantage of that location has been tested out by the individual. A few cases will illustrate this point probably better than an extended discussion: I have two patients in New Orleans who spend a part of their summers at a resort in the mountains of Tennessee. One of these patients is perfectly comfortable until she reaches their mountain home, where she promptly develops hay fever and is affected until her return to New Orleans or the arrival of cold weather. The other suffers the entire part of the season spent in New Orleans, but is entirely free when living at the mountain resort. I once sent two patients to the same community on the Gulf Coast, one was entirely relieved while remaining there, and the other patient had a marked accentuation of all symptoms, developed a violent attack of asthma, and was brought back to the City in a critical condition. Very often a change of location in the same city may give relief. At times sleeping at a considerable elevation has benefit. I remember one case who claimed that he could sleep in comparative comfort by taking a room on the top floor of a high hotel. Another patient, a contractor, was fairly comfortable while in the business district of the city but on going to certain suburbs would develop an attack. He obtained some relief by having the suburban work supervised by an assistant during the hay fever season.

General Medication.—Among the various remedies that have been most used are belladonna, thyroid, quinine and the calcium salts. Where there is a neurotic background, the bromides may be of value. Adrenalin or other preparations of the suprarenal substance have been used and at times seem to be of value. These and many other agents have been recommended and may be tried out, but the results are rather discouraging.

Anterior pituitary body in a total daily dosage of 15 to 30 grains (1 to 2 Gm.) is now being employed, and while it is too soon to express a definite opinion, the results so far seem to be favorable.

Some seem to obtain a certain amount of relief from acetylsalicylic acid; it is usually employed in five to ten grain doses until the patient is relieved or its lack of efficiency for the particular case has been established. The following combination will often do much toward contributing to comfort while specific measures are working out more permanent results:

		or
Codeinæ Sulph.	gr. iij	|2
Camphoræ Monobrom.,	gr. xv	1|0
Quininæ Hydrobrom.,	gr. xv	1|0
Acidi Acetylsalicyl.,	gr. l	3|3

M. ft. cap. no. xv.
Sig.—One every four hours when needed.

Local Measures.—Here again many plans and remedies have been suggested. They may be tried out in individual cases and promptly discontinued if found to be without value. Chief among these is adrenalin used in the form of a spray. It sometimes gives temporary relief, and it may tide the patient over a paroxysm, but many feel that they are benefited for the time being only to experience a reaction later that more than counterbalances the good accomplished. Immediate and fairly persistent relief has been known to follow packing the nose with pledgets of cotton moistened with adrenalin and giving a hypodermic of the drug at the same time. As a general rule, adrenalin is at best disappointing in the majority of these cases. Spraying or douching the nose with normal saline or the various antiseptic solutions or oil sprays containing menthol, camphor, etc., come under the head of those measures that may be tried out, but are usually unsatisfactory and sometimes accentuate the symptoms. Inhalations of camphor, menthol and benzoin in hot water have been used. Taken as a whole, experience has seemed to demonstrate that local measures are usually more apt to increase the symptoms than to give relief, but this statement should not prevent giving the case that is resistant to specific treatment the benefit of a trial of such measures.

For the conjunctivitis, estivin is being extensively employed and may give considerable relief.

Surgery.—This is another of those measures that may be given a trial, where there is a sufficient abnormality in the nasal passages. Polypi should certainly be immediately removed. Further surgery than this is often rather disappointing.

Specific Treatment.—This is based on the desensitization of the patient by the injection of increasing amounts of the offending pollen. Theoretically it is ideal and practically the results are more certain than any other line of treatment. Where the patient is sensitive to only one pollen, a preparation of that particular one is employed and a large percentage of relief may be obtained by the use of one even of that group of plants. The majority of physicians are using principally timothy pollen for the spring type and ragweed for the fall. Wherever any other pollen can be definitely incriminated, it should be employed, if possible. The usual plan is to begin about six or eight weeks before the attack is expected and inject at seven day intervals the specific pollen in gradually increasing doses, beginning with about two units and increasing to about one thousand. Where the patient has that type of trouble which appears in both spring and fall, an average working schedule is to begin in the spring with the timothy pollen (or other if indicated) and continue it until the season of expected discomfort has passed, or until about six weeks before the period of fall pollen when the ragweed (or other pollen if indicated) is begun in the minimum dose and increased just as in the first instance. There is considerable question as to the benefit of pollen injections as a measure of treatment after the development of the disease. The claim is often made that it is at that time dangerous and if used at all should be given in very small doses. When properly employed, the pollens are as safe and efficacious after the development of the disease as they are for prophylaxis. A satisfactory working plan at this stage is at first to inject a small dose, say two or three units, and if there be no unfavorable reaction to use twenty-five units for the next dose, then one hundred, then five hundred, then one thousand unless relief is obtained. Aside from an occasional transient accentuation of the symptoms, any unfavorable reaction is at least exceedingly rare, and the early use of large doses has seemed to give a much greater percentage of relief. Where relief is obtained, the frequency of the doses must be decided by the duration of the benefit. For example, if the amelioration of symptoms lasts four days, the dose may be repeated in three days. It is the custom of many physicians to use with the pollen a bacterial vaccine, either stock or autogenous, the latter made from the nasal secretions is best. While it is impossible to make a definite statement, this plan seems to be of some advantage and is certainly worthy of investigation. All injections should be made subcutaneously. In some instances benefit may be obtained for a time from the use of pollen, and later no beneficial effects be produced; in other cases, persistent treatment year after year will greatly lessen the violence of the attacks. Some of the larger clinics have reported on large series of cases and the concensus of opinion seems to be that about 75 to 80 percent of the cases obtain from 75 to 80 percent of relief, some being entirely cured and others benefited in only varying degrees.

Complications.—The principal condition that might be classed as a complication is that of the development of asthma. Should this condition arise, it should be treated as the same condition arising without the preceding rhinitis.

ASTHMA

General Statement. Definition.–Asthma is that disease which is characterized by paroxysms of dyspnea that are expiratory in character and are not the result of gross pathological changes in the body. Dyspnea may be divided into two groups:

1. Asthma, also known as primary asthma, spasmodic asthma, or bronchial asthma.

2. Symptomatic dyspnea, which may be the result of such conditions as circulatory disease, pulmonary disease, or nephritis. The consideration of this group comes under those particular diseases that are the etiological factors.

The discussion here will be of the primary type, as this is the only group to which the word asthma is being applied today by the profession.

Various subdivisions are recognized, such as intrinsic and extrinsic. Also these cases are grouped from an etiological standpoint as pollen asthma, food asthma and bacterial asthma. Walker and others recognize bronchial asthma and asthmatic bronchitis. While this differentiation is interesting and probably correct, for reasons of convenience it will not be adhered to in this chapter.

The mechanism of the attack has never been explained in an entirely satisfactory manner. The consensus of opinion seems to be that it is due to stimulation of the constrictor fibers of the vagus, producing a contraction of the muscular coat of the small bronchial passages. This results in difficulty in expelling the tidal air and produces dyspnea of the expiratory type. It seems rather hard to harmonize this theory with the fact that known obstructions, such as are found in diphtheria of the larynx, result in dyspnea that is principally inspiratory. It is true that in the latter condition the obstruction is higher up, but such factors still inject the element of doubt as to the last word having been said upon this subject. It has been well demonstrated that the attack is the result of proteid elements acting upon an organism that is sensitized to that particular material, the asthmatic paroxysm being really an anaphylactic reaction.

Incidence.–Any age, race, or type of individual may be affected. The exciting factors are so many that some of them are operative almost anywhere and under almost all conditions. There are some places that are naturally more subject to certain types of the disease and other places which enjoy a relative immunity. This will be brought out in later paragraphs.

Etiology.—Predisposing causes. There are many predisposing causes with special relation to the particular type of asthma. Another important factor is heredity. While the individual does not inherit asthma as such, there is no doubt as to the tendency to inherit a family predisposition. These will be discussed in detail under the head of diagnosis.

Exciting Factors. These may be grouped as follows:

1. Inspired material
   (*a*) Pollens
   (*b*) Animal Emanations
   (*c*) Other Material
2. Foods
3. Bacteria

Functional nervous disorders may play a certain etiological rôle as will be discussed later.

Course and Prognosis.—Of importance here are many factors, such as the age of the patient, the duration of the disease, the etiology, and the facilities for special treatment. There is a distinct tendency to chronicity and a period of relief will often be followed by a recurrence of the condition when the patient is again subjected to the original cause. The prognosis as to life is good; the principal source of trouble is lowering the resistance of the individual to the ravages of other diseases, particularly pneumonia. Asthma in the presence of organic heart disease is of grave prognostic importance.

Symptoms and Diagnosis.—The diagnosis of asthma as such is usually comparatively easy. The establishment of an etiological diagnosis is often fraught with much difficulty. These will be discussed separately.

General Diagnosis.—There are certain signs and symptoms that are usually present and these taken together will seldom leave an element of doubt as to the condition. One essential finding is expiratory dyspnea. The other evidences will depend to a greater or lesser extent upon the duration and severity of the attack. The patient is usually found sitting up and supporting the weight of the body largely upon the hands, so as to raise the shoulders and fix the attachments of the accessory muscles of respiration. The expression is anxious and the individual shows every evidence of air hunger. Speech is interfered with and there is a tendency for the patient to enunciate only one or two syllables at a time, taking a breath after each vocal effort. The cough is at first non-productive, later much material is brought up, which often contains rather characteristic findings, such as Laennec's pearls and Curschmann's spirals. During the attack there is a marked tendency to an intolerance of much clothing or covering. It is not unusual to find the patient in night clothes with collar open, sitting at an open window, even in the coldest weather. Depending upon the stage of the attack, when the examination is made there may be found almost any type of rale. These at first are dry, but later, during the stage of productive cough, mucous rales predominate. Physical examination of the chest will also indicate the presence of an abnormal amount of residual air. The chronic asthmatic will usually present the characteristic evidences of emphysema.

Etiological Diagnosis.—The investigation here includes an analysis of the history, the cutaneous tests, and the therapeutic tests.

Analysis of History. This requires the most painstaking attention to detail. Some of the considerations of importance are suggested in the following:

Age. It has been fairly well demonstrated that the asthma beginning in infancy and early childhood is largely the result of food, that beginning in early adult life is principally from inspired irritants, that beginning later in life is probably bacterial in origin. It should be borne in mind that any one of these types may begin at any age, and also that they may be mixed; that is, several factors may be operative. Another important consideration is that in the chronic cases bacteria will probably sooner or later play a part. The longer the condition has persisted, the more probable is polysensitization, for example, the individual may begin with a food asthma and, as the resistance is lowered, become affected by respiratory irritants, or bacteria, or both.

The Effect of Season. When an individual is subject to paroxysms at one time of the year and not at another, it naturally indicates that the exciting factor is something that is operative at that time of the year only and often the actual cause is clearly indicated. For example, a patient has asthma beginning about the middle of August and lasting until the first frost, and is free from it at other times. This would exclude all factors except those that are operative in that season only. As the average diet is largely the same throughout the year and as the bacterial flora of the respiratory tract is active at other seasons, these would be excluded. The spring pollens could be excluded here also, as well as emanations from animals. In fact, it has been definitely established that the only offending materials operative exclusively in that period are certain pollens; and, as the particular plants of each section of the country have been carefully studied, it is now possible to establish a definite diagnosis with reasonable certainty. This case in New Orleans would mean a ragweed asthma.

Another Example. A patient has asthma more or less throughout the year, and a history can be obtained of attacks during the winter months. The pollen of plants could be absolutely excluded, at least as the only cause, and the investigation must extend to those factors operative at all seasons, such as foods, bacteria, and emanations from animals. If a further history could be obtained of the attacks being more frequent during those seasons of the year when acute respiratory infections are most common, the bacterial type of the disease would be fairly well indicated.

Effect of Location. The investigation here is, as to whether or not the individual has asthma at one place and not at others. If such be the case, it would indicate the cause as being present at one place and not at another. For example, a patient has asthma in Philadelphia and not in Washington. This would largely exclude food asthma, as the diet would probably be about the same at both places. It would exclude bacterial asthma, as patients carry their bacteria with them. An exception to this would be freedom from attacks in some high, dry climates, such as certain sections of Texas, Arizona, New Mexico, etc. Another exception here would be where a difference in diet could be established. For example, patients living in the interior and coming to a seaport town may eat largely of sea foods to which they might be sensitive. Possibilities of this kind naturally require careful investigation. Practically the only etiological factors that are distinctly local in character are the respiratory irritants, as pollens, and animal emanations.

Special Considerations. Very often patients give a history that leads directly to the cause of their trouble. For example, they may have learned through experience that some particular factor will precipitate an attack. The following case will illustrate:

Mr. S., a baker, gave a definite history of more or less constant discomfort with frequent violent paroxysms as long as he followed his trade, and an entire freedom from symptoms whenever he absented himself from the bakery for a sufficient length of time. He was sensitive to flour dust.

Cutaneous Tests. These are carried out by using the specially prepared food allergens and preparations of the various pollens, animal emanations, etc. Some prefer to inject these intradermally. The usual plan is to apply the material to scarified areas on the forearms, sensitiveness being indicated by a reaction as an urticarial wheal or redness. These findings should be regarded with some conservatism, an apparent reaction or absence of reaction not being considered as final evidence for or against sensitiveness to the material. This plan of investigation is one of much value and it is probable that the near future will see advances made to the point where it will be indisputable from a diagnostic standpoint.

Therapeutic Test. This depends upon giving the patient the benefit of the treatment indicated by the other avenues of investigation. For example, in the case of the baker previously referred to, irrespective of the cutaneous reaction if the patient were removed from the environment where he was subjected to flour dust and his condition was relieved, a diagnosis might be considered as having been established. If a certain food is suspected as being the cause, for example, cow's milk in the case of a child, and this food is withdrawn and the condition relieved, no more certain diagnosis could be necessary.

Prophylaxis.—There is nothing definite that can be said here further than the various and many suggestions that are evident from the consideration of diagnosis and treatment.

Treatment.—This will be divided into specific treatment, empirical treatment, and the relief of the acute attack.

Specific Treatment.—This includes those various measures such as removing the offending material from the patient, removing the patient from the offending material, and desensitizing or immunizing the patient as may be indicated by an etiological diagnosis. We should include in this any change in location that gives relief. It is well known that many asthmatics do better in certain sections, as the mountainous regions of Arizona, New Mexico, Colorado and some sections of Texas. The same applies to many other parts of the country, as the White Mountains. Very often relief may be obtained merely by removing to another neighborhood or community where the individual is not subjected to the source of trouble. The following illustrates:

Mr. M. had a nice home on a prominent avenue in New Orleans. His house was built on the back of his lot. The adjoining lot in the rear was occupied by a house built near the street and was tenanted by a family of laborers who conducted a delivery business. Their stable was built on the rear of their lot, almost under the bedroom windows of Mr. M. He gave a history of having asthma whenever he was at home and not anywhere else, and he proved to be sensitive to horse dander. Upon advice he sold his home and moved to another neighborhood, securing entire freedom from his previous trouble.

Pollen Desensitization. Where the offending pollen can be determined much can be offered in the way of relief of symptoms or even a complete cure. The consensus of reports from the various clinics is that about 75 percent of the cases receive about 75 percent of benefit. That is, something like 25 percent of the cases are not improved at all, while about 75 percent receive benefit ranging from a slight amelioration to a complete relief and permanent cure. So large a percentage of satisfactory results are certainly worth patient and unlimited attention to detail.

The pollens are put up by the various pharmaceutical houses and the usual plan is for the solutions to be arranged in series of increasing strength. The procedure advised is to begin about six or eight weeks before the expected attack, giving one or two doses a week in increasing amounts. If the trouble has started, relief can be obtained in a great many cases by the use of this type of treatment. The reactions of different individuals present a marked variation both as to type and duration. A safe plan and one that is followed by many clinics is to begin with a small dose and to base the size of successive doses and their frequency upon the demonstrated effect of the preceding administration. For example, if there is no appreciable reaction, the size of the dose may be rapidly increased. With regard to the interval between injections, if a patient is relieved, say for four days, the doses can well be spaced three days apart. If the relief is of three days duration, the doses may be given two days apart. One clinic has reported a case that obtained complete relief by the use of pollen, but only by its administration three times a day. In the author's experience in the treatment of asthma and hay fever, if the condition has already developed the plan has been to test out the tolerance of the patient by the administration of a few units of the suspected pollen and rapidly to increase the dose say to 25 units, 100 units, 500 units, 1,000 units, unless relief or unfavorable action contra-indicates such a rapid increase. The ideal plan, of course, is to use the pollen or pollens to which the individual is sensitive. When for any reason this cannot be worked out the patient may be tried with timothy for the spring season and ragweed for the fall season. When the asthma continues throughout the summer season, it is advisable to begin with the timothy about six weeks before the expected beginning of the first symptoms, continuing this until about July, when a change is made to ragweed. In beginning the ragweed under these circumstances it will be necessary to start with a small dose and to first test out the tolerance of the patient.

Emanations from Animals. While it is possible, and is often carried out successfully, to desensitize a patient to the emanations of animals, it is usually more satisfactory to remove the individual from the offending material. In the present days of automobile travel and modern living facilities such a plan can usually be carried out with perfect convenience, particularly as the horse is the most common of the offending factors.

Immunization against Bacteria. This is carried out by the use of vaccines. The ideal material is the autogenous vaccine, though even this, of course, is largely a matter of guess. There are so many organisms found in the bacterial flora of the respiratory tract that the actual offender is usually difficult to locate with any degree of certainty. The laboratory is, therefore, reduced to the necessity of making a mixed vaccine which may or may not have a sufficient number of the offending organisms. In fact, the patient may be suffering from an invasion of more than one organism. When an autogenous vaccine does not seem to meet the requirements another should be prepared. Particular care should be exercised to have these prepared from the proper material. Probably the best plan is to use the secretions from the nose, throat, and bronchial passages. The stock vaccines are often employed. A favorite preparation is the mixed polyvalent vaccine, respresenting the common bacteria of the respiratory group, such as the commercial preparation known as "Influenza vaccine, mixed." Many prefer in the general management of the case to try first the stock vaccines, and, failing to get results, to employ the autogenous. In any event the dose should be small at first, possibly about 50 million and gradually increased up to several billion. The custom is to space these injections at about three-day intervals. Probably the most common cause of failure is not giving a sufficient number of doses. A series of ten to twenty injections would probably be a safe average, depending, of course, upon results. The size of the dose and the frequency of the administration should be regulated to a large extent by the reaction obtained—both local and constitutional.

Foods. It is seldom advisable to try to desensitize a patient to food. The possible range of diet is so extensive that no one food or even group is essential, and it is much more logical to omit the offending material entirely. Sometimes after a period of years the sensitiveness to a particular article may be lost and its use may be resumed, with sufficient caution. This particularly applies to children who in the process of development often acquire an ability to take food to which they previously reacted unfavorably.

Surgery.—Surgery may be of advantage particularly in removing some special source of trouble, such as diseased tonsils or a deflected septum.

Empirical Treatment.—A large percentage of the drugs in materia medica have at times been used. It would not be of advantage to discuss the majority of these.

Iodides. Potassium, sodium, or ammonium iodides have been used by many generations of doctors, and certainly have a large field of usefulness. The potassium salt is the one most commonly employed, and seems to be of particular value in the bacterial group of asthmas. It sometimes accentuates the trouble in the respiratory group, particularly if the patient also presents a hyperesthetic rhinitis, such as hay fever. The usual plan is to give the dose three times a day and when there is a particular time in the twenty-four hours that asthma is most apt to develop; as, for example, the nocturnal paroxysms, a large dose is given preceding the expected attack. In giving iodides, it is always advisable to begin with a small dose so that the tolerance of the patient may be ascertained or developed. When the iodides have not been previously used, a safe plan is to begin with about 5 grains (0.3 Gm.) three times a day, increasing by one grain at each dose until as much as 25 or 30 grains (1.6 or 2 Gm.) is reached or relief has been obtained. If benefit is not obtained by this time the drug should be discontinued. If there is sufficient improvement at any period, the dose may be continued for some weeks at the amount then being used and then gradually reduced, the patient being watched carefully for the effect. It will then be possible to determine a maintenance dose that will keep the patient comfortable. Very often in the nocturnal asthma one dose of 15 to 30 grains (1 to 2 Gm.) at bedtime will meet all the requirements.

Anterior Pituitary Body. This is at present being extensively used and the indications, so far, are favorable. The usual dose is from 5 to 10 grains (0.3 to 0.6 Gm.) three times a day. The theory of its use is that when two individuals are subjected to the same environment and one has asthma and the other does not, the asthmatic either has something that the other has not, or is deficient in something that the other has, and that this something is a sufficient amount of the products of the anterior pituitary body, which defect can be met by feeding a preparation of the gland. It might be mentioned in passing that this treatment is being tried out for the whole related group of conditions (hay fever, urticaria, eczema, etc.).

Relief of Acute Attacks. General Care. Much may be done in the way of relief by attention to the many details looking toward the placing of the patient in a state of well-being, this includes intestinal elimination, where such is indicated, a large amount of fresh air, proper clothing and covering, and a careful diet. The diet particularly should be one that will make a minimum tax on the digestive ability and the least apt to favor the formation of gas. It is particularly desirable that clothing be such as not to constrict the body, especially the chest. There should be nothing tight around the neck. Any form of heating that will interfere with good breathing air should be avoided; this would exclude gas heaters and kerosene stoves.

Medication. Many drugs have been used with various degrees of benefit. Only those most commonly employed will be discussed.

Epinephrine. This drug is now in the U. S. Pharmacopeia. There is also an official solution of 1 to 1000 strength called Liquor Epinephrinæ Hydrochloridi (Solution of Epinephrine hydrochloride). The most commonly employed preparation is still the old proprietary adrenalin. As epinephrine is by far the most important agent that we have at our command, it may be well to consider a few important points.

Preparation. The 1 to 1000 solution is used almost exclusively. The ampules are put up in much weaker as well as the standard strengths and it is a very common error for the physician to use these without noticing the fact that he is really not giving enough of the medication to be of material benefit. The solution does not keep well, and, fortunately, deterioration is evidenced by a change in appearance. The solution when good is perfectly water-clear, as it begins to deteriorate it takes on a muddy appearance or becomes yellowish or brownish in color. Only the perfectly clear product should be employed. In using it the greatest care should be employed not to contaminate it by touching the cork where it will come in contact with the solution or by dipping anything but a sterile needle into it.

Size of Dose. About 5 to 15 minims (0.3 to 1 cc.) of this 1 to 1000 solution is the usual dose given subcutaneously. It is desirable to use the smallest amount that will meet the actual requirements of the case. Where the tolerance of the patient is not known, it is certainly best to begin with a small dose, probably 3 to 5 minims (0.2 to 0.3 cc.) and to note the effect. If relief is not obtained in 15 minutes, 8 to 10 minims (0.5 to 0.7 cc.) may be injected. If this produces no unfavorable reaction and fails to give relief, 15 minims (1 cc.) may be used at the next injection. Care should be exercised that the solution is not injected into a blood vessel, as the average subcutaneous dose if given intravenously would cause a profound reaction.

Duration of Effect, etc. A single injection will often tide a patient over an asthmatic attack. Others may be relieved only for a short period. There is a marked tendency for the drug to lose its effect if frequently repeated. This is manifested by a progressive shortening of the period of relief until at times a full injection (1 cc.) produces only a partial benefit of a few minutes' duration. Fortunately, it is usually the case that if the drug is omitted for a few days it may be resumed again with all of its original value.

Unfavorable and Other Side Effects. As a rule, when a dose sufficient to produce relief is given there are some other effects that should be expected and it is often desirable to prepare the patient and the family for them. These include blanching of the face, a sense of coldness, more or less marked tremor, and a more or less violent heart activity that is felt by the patient. In addition to these evidences, there is at times a more decided reaction. The author has had two cases that experienced marked discomfort in the kidney region. In one of these it took the form of excruciating pain, in the other the sensation was described by the patient as though his kidneys were being forcibly squeezed. In young children collapse may follow even a small dose. Particular care should be exercised in the use of epinephrine in the presence of high blood pressure. Another consideration of importance here is the use of epinephrine and atropine together. The effect of epinephrine on the circulatory apparatus is so transient that it may safely be followed with atropine in a short time. On the other hand, the effect of atropine is more lasting, and its well known action on the vagus is such that it is inadvisable to use epinephrine in large doses when the patient is under the effect of atropine. An old illustration of teachers is to liken the relation of the vagus to the heart, to the lines used in driving a spirited horse. In the case under discussion, we might carry this illustration further and speak of cutting the lines with atropine and then applying the whip of epinephrine.

It is usually inadvisable to allow the patient or the patient's family to administer this drug, as the tendency is towards using it too frequently or in too large doses.

Combinations. Various combinations of adrenalin have been suggested. Of these a mixture of adrenalin and pituitrin has been claimed by many to be of value. Pituitrin is thought to prolong the effect of the adrenalin, although this is still a matter of doubt.

Morphine and Atropine. Next to epinephrine, this combination is perhaps the most valuable remedy for the relief of an acute attack. The principal disadvantage lies in the fact that asthma is distinctly a chronic condition, that in many cases it will persist for years, there is, therefore, the danger of the patient becoming an addict. This possibility does not obtain now to the same extent that it did before the passage of the Federal Narcotic Law, but at the same time it is still worthy of consideration. Another disadvantage is the idiosyncrasy to these agents that is found in many patients. It has not been demonstrated that an asthmatic is more apt to have this idiosyncrasy than the average individual, but this seems to be, at least, a possibility. This combination is particularly of advantage in the management of those cases where epinephrine has lost its effect. Patients can be tided over in this way for a few days until the value of epinephrine has been reestablished, as previously discussed.

Benzyl Benzoate. This is usually employed as a 20% solution, in doses of 1 fluidrachm (4 cc.). It is used well diluted with water. Occasionally a case is found in which it will give marked relief for one or two doses. Its field of usefulness is certainly limited, and in the majority of cases it seems to afford no appreciable relief.

Aromatic Spirit of Ammonia. This seems to exercise a certain amount of benefit in some cases. At times it is possible to abort a light attack by the early administration of a fluidrachm (4 cc.) repeated in one-half hour if needed.

Ethyl Carbamate. At one time this was extensively employed. If it has a field of usefulness, it is decidedly limited.

Acetylsalicylic Acid. In some cases this is of benefit if given in doses of 10 to 15 grains (0.7 to 1 Gm.). It should be used with some caution.

Nitroglycerin. Those cases obtaining relief from this drug are probably cases of dyspnea from high blood pressure or angina pectoris and not true asthma.

Atropine. While this seems to reinforce the effect of morphine, when used alone it carries little, if any, benefit.

Stramonium. This is used principally by being burned and the vapor inhaled. It is the chief constituent of most of the patent asthma powders that are employed in this way. It is used alone or mixed with lobelia or other drugs. Some patients obtain considerable relief from these preparations.

Digitalis. This enjoys a certain reputation, but it is probable that those benefited by digitalis have been cases of cardiac dyspnea.

Caffeine. This is employed principally in the form of coffee. Some patients obtain relief, particularly in the early part of a light attack, by drinking a cup of hot coffee.

Complications.—There are many possible complications that may develop from continued asthmatic attacks. Among these are circulatory exhaustion, emphysema, and the "asthmatic state." By this last is meant a condition in which there is a more or less constant asthmatic tendency which shows periods of remission but little in the way of intermission. The prophylaxis in these depends upon prompt and efficient attention to the primary disease—asthma. From the standpoint of treatment there is no specific, and these complicated cases are handled just as the conditions arising from other causes.

The whole problem of asthma is still one that presents much to be learned. Many earnest investigators are devoting time, money, and effort to this problem, and it is not too much to hope that the future will see a great advance in our present knowledge. As it now stands, success in handling these cases depends largely upon the physician's possessing that same abundance of patience in attention to detail, that makes for success in the management of other diseases.

PERTUSSIS (WHOOPING-COUGH)

General Statement. Definition.—Whooping-cough is an extremely infectious, acute respiratory disease resulting from the invasion of the body by the Bordet-Gengou bacillus.

The importance of this disease is not appreciated by the majority of the laity or by a fairly large per cent of the profession. So little is it regarded, in fact, that it is rather unusual for families to take proper precautions to prevent children from being exposed, and it is almost the rule for parents to do little if anything to prevent infected children from passing the disease on to others. There seems to be that feeling that it is "only whooping-cough," and that the child will probably have it anyway so it is better to have it over. That is one of the many false impressions in the public mind that it is the duty of the physician to eradicate. Let me give an illustration. A young minister of my acquaintance who had several children in his family, had one of his parishioners send her child over to his home to be taken care of while she went on a shopping trip. They noticed that the little one was coughing, but were astonished when the mother returned to have her lightly remark that her child had whooping-cough and that she hated to impose on any one else, but had no other convenient arrangement to make. The minister's children contracted the disease and one of them died as a result of it. It is to be regretted that a case of this kind cannot be viewed by the public in its true light, that is as manslaughter.

Incidence.—The disease is not peculiar to any season, race, age or condition. It is most common in the winter, probably due to the increased activity of the bacterial flora of the respiratory tract in that season, and to a greater chance of infection by reason of children being brought in contact in schools and elsewhere. Another contributing factor is that the activities of children are more indoors during the winter months, and the disease is thus more easily spread than it would be by the children being together in the open. Persons of any age may be affected, but it is more common among young children, particularly those under five years of age. Very young infants are commonly immune to many other diseases, such as scarlet fever, but in the case of whooping-cough, they are even more susceptible. It is highly probable that the relative immunity of adults is due to the fact that those who are susceptible to the disease have had it early in life, and one attack seems to establish permanent immunity.

Etiology.—The cause is an invasion of the respiratory tract by the Bordet-Gengou bacillus. Contributing factors are suggested under incidence.

The infectious organism is transmitted in the particles of moisture coughed or sneezed or otherwise emitted by an infected individual. It is hardly probable that a third person often carries infection; though it is a possibility, and people should be particularly careful about handling children that are infected and then coming into contact with others. Those in the household with an infected patient should avoid contact, as far as possible, with other children. Where there is even a possibility of transmitting such a disease, the innocent party should be given the benefit of every doubt.

It is most infectious in its early stages, and it is claimed that the infectious-period is largely over in three weeks or a month. It is safer however to avoid contacts for a period of at least six weeks.

The disease is highly contagious, a large percentage of those exposed contracting it, unless a previous attack has rendered them immune; and, as the diagnosis is usually made rather late in the course of the process, there is much opportunity for many to become infected.

Course and Prognosis.—The incubation period has been variously stated as from one to three weeks; it is probable that the average is about fourteen days. It is one of those conditions in which it is impossible to make a definite statement as to the possible limit.

The course of the disease may be divided in three rather definite stages,—that of onset, that of paroxysms and that of convalescence. Many develop the paroxysmal stage early and in some it is fairly late or even missing entirely.

The duration is possibly influenced by many factors such as temperature, climate, the age and general condition of the patient and the character of the treatment. It is impossible to determine whether these factors do definitely influence the duration, though clinical evidence seems rather to favor such a supposition. The average course of the disease is about two weeks from the beginning of the symptoms to the development of the characteristic paroxysms; about two weeks of the paroxysmal stage; about two weeks during which the case convalesces to recovery. Following this there may be a certain amount of coughing that is more or less continuous or that seems to be easily excited by any adverse conditions, such as exposure. There is an old saying among the laity that when a child has had the disease he will continue to cough through the following winter. For many months after the characteristic symptoms have subsided it is not unusual for any sudden stress, such as romping or shouting in play, to bring on a paroxysm of coughing.

There are three principal causes of death for which the disease is directly responsible. It may be a contributing factor in many other cases.

The patient, particularly the young child, may die as the result of paroxysms either by strangulation or as a result of convulsions. Young children, particularly, should be closely watched during the paroxysmal stage, so that in the case of violent attacks they may be given the benefit of every attention that can be afforded them.

Exhaustion and malnutrition may be a direct cause of death, and the case should be handled from the very beginning with this possibility in view.

Bronchopneumonia is by far the most frequent source of trouble. It should be regarded as a possibility always and the case receive sufficient intelligent attention to prevent this complication, if possible or at least to recognize it promptly should it develop.

When adults contract the disease, it usually runs a much more benign course. The majority of deaths are either in the case of young infants or of children who are otherwise defective, such as those with congenital heart disease.

Symptoms and Diagnosis.—The diagnosis is usually not made till late in the progress of the disease. In fact, in the majority of instances, it is only established by the household noticing the characteristic whoop; but it is possible for the physician to make a tentative diagnosis in most of the cases before the development of this symptom, by a careful evaluation of all available data.

History. This is of maximum importance. Where a child who has not previously had the disease has been subjected to a definite exposure, and who at the expiration of the usual period of incubation begins to show symptoms that are suggestive of pertussis, the case should be treated as though a diagnosis were positive and this treatment persisted in until something definite has been established one way or the other. This should apply particularly during the course of an epidemic.

Onset. There is very little in the onset that can be considered as characteristic. There may be a period of loss of appetite, and general indisposition, though as a rule the first symptom noted is coughing. The patient is usually thought to be taking cold; but, instead of clearing up in a day or two as is the rule with common colds, the condition grows progressively worse.

Cough. In the early stages there is usually very little that is characteristic in the cough. It often reaches a paroxysmal stage long before the characteristic whoop develops. It has been frequently stated as of diagnostic importance that the cough is worse at night, but this may be misleading, as the same is true of other bronchial troubles, in fact it is not unusual to see an individual go an entire day without coughing at all and still have difficulty in getting sleep or rest during the night on account of this symptom. Sometimes long before the whoop develops there is a tendency for the cough to end in vomiting. This may be considered highly significant, but not conclusive, as the same tendency exists in many cases where the disease is not pertussis. Another somewhat characteristic symptom, though not found exclusively in this condition, is for the paroxysms of coughing to be so hard as to give rise to cyanosis, this may develop fairly early.

Whoop. This is the only absolutely positive evidence of the disease. Unfortunately, the physician on his occasional visits may not have an opportunity to hear the whoop, and the definite diagnosis often has to be made by the nurse or family. The whoop results from the concerted influence of several factors that have never been explained in an entirely satisfactory way. The periods of coughing are of such a character as to prevent an inhalation until the residual air has been largely exhausted and often cyanosis develops; there is then a long drawn inhalation in which the air is taken in with a crowing sound. One paroxysm of coughing may include several of these cycles. The paroxysm may end with the patient more or less in a state of exhaustion, and very often terminates in vomiting.

Vomiting. As previously suggested, this is one of the suggestive symptoms. While coughing of sufficient violence may cause vomiting in other conditions, in pertussis it is of such character as to make emesis particularly common.

Chest Findings. There is usually evidence of bronchitis and almost every type of rale may at one time or other be heard, often many being present at the same time. There is very little difference in the chest findings here from those in the ordinary type of bronchitis.

Eyes. There is a tendency to injection of the conjunctiva, and it is not unusual to find small hemorrhages; sometimes these may be rather extensive in character.

Blood Examination. For many years there has been an effort made to diagnose pertussis by blood examination, but with rather unsatisfactory results. There is a tendency to an increased total white count, twelve to fifteen thousand not being unusual. The increase is principally in the lymphocytes. Of course late in the disease there may be evidence of secondary anemia; also in the case of complications, the blood picture may be materially influenced.

Agglutination and Complement Fixation Tests. These are still somewhat in the experimental stage; they are not available to many physicians, and their proven value is not such as to have aroused the interest of the profession at large. They are certainly worthy of further investigation.

Summing up, it may be said that the early diagnosis rests upon a careful evaluation of all the obtainable data, basing a conclusion on the probabilities. If we wait for the development of the characteristic whoop, we have lost much valuable time for contributing to the comfort and safety of the patient.

Prophylaxis.—In the handling of a case fraught with so many possibilities of disaster, it certainly behooves us to use every possible effort to prevent the spread of infection. In most cities it is a reportable disease and, while it is not customary to placard the houses or impose rigid quarantine restrictions, the reporting of cases is of much value, particularly from the standpoint of the schools. Where it is a reportable disease, the report should be made promptly upon the establishing of a probable diagnosis. Where there is a reasonable possibility that the condition is whooping-cough, particularly in the case of a school-child, it is better to subject the one individual to a certain amount of inconvenience than a whole roomful of children to the possibility of infection. Not only this, but the physician should see, as far as possible, that the necessary restrictive measures are carried out by those concerned. The details of prophylaxis will be considered in the general care of patients.

Treatment.—Unfortunately we have no specific and the efforts of the physician are directed toward preventing the conveying of the infection to others, and contributing to the safety and comfort of the patient by general care and trying to ameliorate the severity of the manifestations of the disease. It should be remembered, however, that in these particular fields much can be accomplished.

General Care.—Much can be done here both for the protection of the community and for the welfare of the individual. It is always a disease in which a long siege should be expected; therefore, in making arrangements for the care of the patient, it should be with this fact in mind.

Isolation. The main difficulty in isolation is that the disease is of so long a duration and that during a large part of this time, sometimes during the entire period, the patient is not sufficiently sick to be confined to bed. Add to this the fact that keeping the patient in the open air as much as possible is an important part of treatment and it will be seen that isolation becomes a much more complicated problem than in such cases as scarlet fever or diphtheria. Under no circumstances should patients be allowed at any kind of gathering or to come in contact with other children. One of the most reprehensible customs, is one for which doctors are responsible, that is of permitting patients to be brought to their office; this is a practice of many eminent physicians. Not only does it expose the other patients in the waiting room, but many more may be exposed in the process of getting the patient to and from the office. Personally, I try to make it an inviolable rule that no coughing patient may come to my office. Mothers can be taught that while their sturdy youngsters may never be in danger themselves, they may infect some delicate child who may succumb to the disease. I know of one community that, during an epidemic of whooping-cough, established what they called a "Whooping-cough Club." Each house that had the infection or had had it entertained the whooping-cough patients of the neighborhood, or those who had had it; while those houses that did not have the infection entertained the children who might be susceptible.

Where possible the members of the family who have not previously had the disease should be removed to another home and kept under observation until the period of incubation has passed, when if they have not developed symptoms, restrictions may be removed. In the case of those in an infected household, who have previously had the infection, there need be no restrictions imposed, except to prevent their coming in contact with other children. The isolation of patients should be maintained until the infectious period has passed, this is certainly as long as three weeks, and five or six weeks is much safer.

Treatment Quarters. The patient's bedroom should be selected with a view to the maximum of light, ventilation, and proper heating facilities. An open fire place is desirable, as it facilitates the proper heating of the room, and at the same time lends itself to ventilation. There is not the necessity in whooping-cough of stripping the room of furnishings as there is in scarlet fever. Two rooms for the treatment quarters are sometimes desirable so that the patient may be moved from one to the other at pleasure. A balcony opening from the sick room is of advantage, as it will allow the patient to take air without the possibility of coming in contact with others. Many patients are never ill enough to require confinement to bed, and very few without serious complications require it for a long period, therefore, they may spend a large part of their time in the yard or even be taken to some convenient place where they can get fresh air and sunshine, provided they are not brought in contact with others.

Fresh Air. Where the patient is confined to bed, the room should be sufficiently heated, but a supply of fresh air is indispensable. This is one reason why it seems best to have a room with an open fire place when possible. When the patient is not confined to bed and the weather will permit, he should be kept out of doors during the day. This may be done by the use of a porch or, in favorable weather, getting out on a lawn.

Nursing. One of the main considerations in nursing average cases, particularly when they are infants, is to keep them constantly under observation so as to lessen the danger of death resulting from a paroxysm. In these paroxysms, the little patient can often be supported and cared for in such a way as to contribute to relief. Sometimes considerable benefit may be derived from introducing the finger wrapped with gauze back to the pharynx and removing the accumulation of mucus. Another consideration in nursing, particularly in the ambulatory case, is to have a nurse of sufficient intelligence and discretion to prevent the child from infecting others. In the majority of cases a trained nurse is not essential, but at least one or more members of the household should be assigned to duty and given the necessary instructions. Another consideration is to have the nursing of such a character as to secure the very best type of feeding, as this is a feature of much importance in treatment. The nurse should try to avoid unnecessary contacts, particularly going directly from the patient to other children as is the custom of mothers in caring for a household.

When to Confine to Bed. In the presence of any appreciable fever, the patient should, of course, be confined to bed; also in the case of exhaustion or complications.

Clothing. This will depend entirely upon such factors as the temperature and the condition of the patient. The term "comfortably warm" will probably express what is desired; that is, while they should not be kept over clothed so that they will be subjected to perspiration, at the same time it is better to clothe them a little more than we would normally. In cold weather woolen underclothing is, of course, desirable. In damp or stormy weather, the patient should be properly protected.

Baths. A daily cleansing bath is always desirable. Particular care should be taken to avoid exposing the patient to chilling. There are few things that contribute more to a cough in many cases than to expose the surface of the body to cold. These patients should be given a rapid warm bath in a warm room. In the presence of fever, it should be a warm sponge bath.

Bowels. Careful intestinal elimination should be maintained. This is best done by the use of mild laxatives, as violent purgation has a tendency to exhaustion. Olive oil is by far the most desirable agent where it can be conveniently administered. Other mild laxatives, such as milk of magnesia or phenolphthalein, may be used as indicated.

Disposal of Infected Material. There is not the necessity for extreme care as in scarlet fever, but it is certainly not advisable to allow infected material to be deposited on the sidewalks or other places where there is a possible chance of infecting others. The secretions from the respiratory tract should be collected on cloths and burned or otherwise disposed of. The patient should be served in individual dishes, and all bed linen, towels, etc., boiled or otherwise cared for.

Diet.—In arranging the diet, certain factors must be taken into consideration. These are: the duration of the disease and the natural tendency to exhaustion, lowered nutrition and anemia, that emesis will sooner or later develop, and that some foods tend to excite coughing. In nursing infants it is particularly desirable that breast feedings be continued and every effort should be made to keep the mother's milk up to the highest possible standard. In febrile cases, the diet must be adjusted to come within the digestive ability and be of such a character as not to increase the febrile tendency. It is rather unusual for the fever to be high in uncomplicated cases or to be of long duration. In feeding the febrile patient, therefore, it is certainly inadvisable to lose sight of the fact that we are feeding one who is really ill. When the stage of vomiting is reached the food must be of such a character as will be handled rapidly by the stomach, and the feedings so frequent that in spite of vomiting the proper amount of nutrition will be maintained. If the stomach is emptied by vomiting, the patient may be promptly fed again as there is usually a considerable period before the next paroxysm. Another consideration in diet is that very often the cough may be influenced by the character of food. Some patients tolerate warmed food best, others, cold food. It is not unusual for an article like ice cream to excite a paroxysm of vomiting weeks after the paroxysmal stage has subsided. Dry food, such as toast, should seldom be given, as the particles may be inspired and give rise to violent coughing. Where the patient can handle it properly, milk should be the mainstay in diet. In many cases the milk will have to be modified to be easily digested. Among the articles of value are the following: milk, modified milk, milk soups, cereal broths, gelatin (with cream), custard, milk toast, fruit juices (with milk sugar added), prepared foods like malted milk, etc., and soft well cooked cereals, as grits, mush, cream of wheat, soft rice or strained oatmeal. These last should be served with cream and sugar or with butter, or sometimes with beef juice, though the nutritive value is much lower when served in this way. Creamed potatoes prepared with butter and milk may be given also soft boiled eggs, and very often ice cream. The cream should be made as nourishing as possible, and frozen custard is, of course, the most desirable. In older patients who are not seriously ill, a more liberal diet may be allowed throughout at least the larger part of the time.

The above suggestions are particularly for those cases in which the maintaining of proper nutrition is a problem.

Medication.—This can better be discussed under the head of general medication and the treatment of symptoms. It is necessary to emphasize the fact that we have no specific treatment, and the effect of medication is to lessen the severity of the manifestations and to reduce the tendency to complications. Almost every drug in materia medica seems to have been tried.

Belladonna has been recommended by leading physicians for generations. Jacoby was an ardent advocate of its use. It is claimed that it should be used up to its physiological effect. The custom is to begin with a comparatively small dose, say one drop for a child two years old, given several times a day, and gradually to increase the dosage until the flushing of the face, dilation of the pupils, dryness of the mouth, or other evidences indicate that the physiological limit has been reached. A maintenance dose may be continued for a number of days, depending on the effect. Personally, I have never used it to this extent. Belladonna is more often given in small doses and combined with other agents.

Bromides. Theoretically these would seem to be our most valuable agents for the control of certain phases of the disease. Their tendency is to control nausea, arrest nervous manifestations and prevent loss of sleep. They are non-habit forming and their toxicity is low. In those cases that have an idiosyncrasy, the manifestations are mild in character and disappear promptly upon the withdrawal of of the drug. In my personal experience I have used bromides extensively, and the only material inconvenience that I have noted has been a mild form of cutaneous eruption. For a child a year old potassium of sodium bromide may be given in doses of two or three grains (0.13 or 0.2 Gm.) repeated every two to four hours, depending on the clinical symptoms. In a general way it might be said that the average dose is from 45 to 75 grains (3 to 5 Gm.) for an adult; this may be continued for ten days or two weeks unless there is some contraindication.

Antipyrine. This has been extensively employed and the tendency is to give much more than would be the amount calculated from the average dose as usually stipulated in materia medica.

A combination of these agents is often ordered somewhat as follows (for a child 2 years old).

℞

		or	
Antipyrinæ,	ʒss	2	0
Sodii Brom.,	ʒij	8	0
Tinct. Belladon.,	fʒss	2	0
Syr. Tolu,	q.s. f℥iv	120	0

M.
Sig.—Teaspoonful every two to six hours till relieved.

The relative amount of the various ingredients and the frequency of the dose is indicated by the condition and progress of the patient. This is used in the paroxysmal stage of the disease.

Quinine is extensively employed but its value is still doubtful. No effort has been made here to mention all of the drugs that may be of value, but only those which are generally accepted.

Symptomatic Treatment.—Much of the symptomatic treatment has been discussed in the preceding paragraphs.

Fever. It is seldom that fever is of sufficient importance to require special treatment, except in the presence of pneumonia, under which circumstances the case is handled as would a pneumonia arising from other causes.

Cough. The cough is the cause of more distress than any other feature of this disease. The general medication has been discussed in the preceding paragraphs under the head of Belladonna, Bromides, etc. Various other agents are employed just as in the treatment of cough from other causes. There are some other measures that are of value in the way of lessening the necessity for more active medication. Many of these are old Granny remedies and are handed down from generation to generation. It is not often that the physician will have occasion to recommend these but he will be appealed to as to whether or not he will permit them. Cough candy, as hoarhound and menthol, is commonly used and where it does not seem to interfere with the appetite, there is probably no objection to its use. Sometimes the patient can secure some relief by the frequent taking of small quantities of orange, lemon or pineapple juice saturated with sugar. Warm petrolatum is often given.

Inhalations and sprays sometimes seem to give a certain measure of benefit. The following spray may be tried for children of sufficient age.

℞

		or	
Camphoræ,	gr. iv		25
Eucolyptolis,			
Ol. Pini Pum.,			
Ol. Menth. Pip.,	āā gtt. iv		25
Petrolati Liq.,	q.s. f℥iv	120	00

M.
Sig.—Use in an atomizer.

This should be used in an atomizer that throws a cloud of vapor instead of droplets of appreciable size. The patient should be instructed to breathe deeply while this is being employed.

The following inhalation may give some relief.

℞		or
Mentholis,	ʒj	4|0
Camphoræ,	ʒj	4|0
Tinct. Benzoni Co.,	q.s. f℥ij	60|0

M.

Sig.—Use a teaspoonful to a pitcher of hot water as an inhalation.

This is best employed by adding a teaspoonful of the solution to a pitcher partly filled with boiling hot water; the patient lies with the head near the edge of the bed and the pitcher is so arranged that its top will be lower than the face of the patient; both the pitcher and the face are covered by an inverted trough made of newspaper, card board, or some other convenient material, so arranged that it is inclined upward from the pitcher towards the patient's face. Instead of restricting the amount of fresh air, as is the case with many other devices, this increases the air supply by causing a draft of warm moisture-laden vapor to sweep across the face. Probably the most satisfactory way to use this is to follow it with the oil spray, as mentioned in the preceding paragraph. Various local applications to the chest have been recommended, and the following prescription is probably as satisfactory as any:

℞		or
Ol. Terebinthinæ,	f℥j	30|0
Spir. Camphoræ,	f℥j	30|0
Ol. Olivæ,	q.s. f℥iv	120|0

M.

Sig.—(Shake-label.) Use to moisten flannel and apply as directed.

A flannel may be slightly moistened with this and applied to the front of the chest; it should not be bound in place, but fastened at the corners by safety pins to an undervest or some similar garment. Many have recommended hanging a blanket over the head of the patient's bed, and spraying it with oil of turpentine. There is certainly some question as to the value of any plan which limits ventilation, such, for example, as the use of the croup tent.

Vomiting. Next to the paroxysms of coughing, this is the most distressing symptom. It sometimes assumes a grave character, owing to the interference with nutrition. The control of this symptom has been discussed in part in the preceding paragraphs under Belladonna, Bromides, etc. Sometimes it can be largely ameliorated by proper adjustment of the diet. One of the measures often successful is to give at frequent intervals small amounts of milk and lime water; for example, for a child five years old, two fluidrachms of lime water and six of cold milk. Older children may receive benefit from small amounts of gingerale frequently repeated. At times it is advisable to increase the amount of the bromides. The relief of vomiting as a matter of maintaining nutrition has been discussed under the heading of diet. Many recommend Kilmer's Binder, which is an elastic device for restricting the abdomen. It seems to be of some practical value.

Convulsions. Fortunately these are extremely rare in the course of uncomplicated whooping-cough. When they do develop, the emergency should be met just as in the case of convulsions arising from any other cause. If there is a tendency to convulsions, special attention should be paid to preventing the manifestations of this character, by careful diet, elimination, and the control of high temperature. Whatever may be the cause of the convulsions, it is well known that in many cases the condition is precipitated by high temperature; therefore, in handling a patient with a convulsive tendency, we are more than justified in using antipyretic measures when the temperature goes beyond the danger point. For this purpose an ice bag to the head, body sponging and enemas, can be employed. When medicine is necessary acetysalicylic acid may be used as its temperature reducing effect as compared to its toxicity makes it relatively satisfactory. The antipyrine prescription may be used as recommended on page 157.

Vaccines. The actual value of these in the treatment of pertussis has not yet been definitely established. My personal opinion is that they have a distinct field of usefulness. Spectacular results should not be anticipated, but there does seem to be some amelioration of the severity of the symptoms, possibly some shortening of the paroxysmal stage, and an increased rapidity of convalescence. The stock vaccines are most frequently employed; it is probable that their value depends, to a certain extent, on their being used early in the development of the disease. When begun late, much should not be expected in the way of benefit. My personal preference is for the mixed vaccines, using the specific organism with the various others that are most commonly found in acute respiratory infections. In using a mixed vaccine we should be guided, of course, to a certain extent by the reactions and the number of doses and their frequency will depend largely on the clinical progress of the case. The usual series is five to ten doses, repeated at two or three day intervals. I do not believe that the development of bronchopneumonia should contraindicate, but rather call for the continued use of the vaccine.

Climatic Treatment. Sometimes when convalescence is delayed and the child fails to return to a normal state of nutrition, or is left with a persistent cough, a change of climate will be of benefit; the seashore or mountains seem particularly desirable. Every physician who has had occasion to send patients away for this condition has had opportunity to note the benefit that often ensues.

Convalescence.—Even in the cases of average severity, it is not unusual for patients to enter upon the stage of convalescence in rather a pitiful condition, particularly if vomiting has been a marked feature of the disease. The tendency is to loss of weight, general weakness, impaired digestion, nervous phenomena, and very often rather marked anemia. A highly nutritious diet is certainly indicated, and the diet list should be added to as rapidly as the digestive ability of the patient will permit. It is desirable in older children to begin early the use of such articles of food as broiled steaks, fresh vegetables, etc., and to use every effort to bring them up to the proper standard of weight and strength. Tonics are certainly indicated in many cases. In the selection of these we have to be guided by conditions such as the age of the patient and the evident needs. There is very often a persistent cough and frequent recurrences of acute respiratory infections; these should be combated by prevention of exposure to infections or to inclement weather, proper clothing, fresh air and outdoor exercise.

Complications.—The most frequent complication of a serious nature is pneumonia, usually bronchopneumonia. It should be treated very much as pneumonia developing under other conditions. (See page 101.) It is most important that all cases should be handled with the possibility of pneumonia ever in mind and when in the progress of the disease there is an unexplained rise in temperature, we should consider pneumonia at least as a possibility. Other complications such as chronic bronchitis, otitis, etc., would be handled just as the same conditions arising from other causes.

COUGH

General Statement.—Cough is a symptom and not a disease. It is not necessarily a disadvantage and should not always be arbitrarily prevented. This particularly applies to the so-called productive cough, where it is a necessary process of nature for removing secretions that otherwise would accumulate to the disadvantage of the patient. Cough is often a valuable diagnostic sign, indicating either the presence of some pathologic process, or even by its character giving a valuable clue as to the identity of the disease. While it may be an aid in some cases, in others it does not serve any definite purpose and may markedly interfere with the comfort and well-being of the individual, or it may be of such violence as to do damage by exhausting the patient, causing pain and interfering with rest and sleep. Very often it is more desirable to modify the cough than to suppress it entirely.

Classification.—Many efforts have been made to classify coughs according to their character. One grouping is into productive, or that which results in bringing up bronchial secretions; and non-productive, or that which is not attended with expectoration. There is the classification according to type, as hacking, loose, brassy severe and violent, and then there is the classification according to the source of trouble, as laryngeal, bronchial, nervous, and reflex.

Etiology.—Among the most common causative factors are the common cold, influenza, laryngitis, tonsillitis, bronchitis, tuberculosis, respiratory irritants (tobacco smoke, or dust), nervous instability, and reflex phenomena such as chilling of the surface of the body. These are not listed in the order of their frequency as causes and many other factors too numerous to mention, may participate in the production of this symptom. Many of these conditions give rise to cough of a peculiar character. For example, the persistence of the cough of tuberculosis and the tendency to morning expectoration; the attendant pain of the cough of pleurisy; the whooping character of the cough in pertussis; the productive cough on change of position in bronchiectasis and the hacking cough without evidence of pathology in nervous disorders.

Treatment. General Care.—Cough is often largely a habit and probably in most cases a certain amount of the coughing done is unnecessary. Some patients can be educated to the suppression of a large part of this unnecessary coughing. This was well demonstrated in a large eastern sanatarium recently, by visitors being taken through the wards, where there were several hundred cases of tuberculosis, and not a single cough was heard in the hour that was spent in the institution.

Rest. Complete rest of mind, voice, and body will probably abate the cough, in the average case, about one-half. This has been particularly well demonstrated in the rest treatment of tuberculosis. Talking, laughing, or crying will often bring on a paroxysm in a patient who has been comfortable for hours. Voice rest is of particular advantage in relieving the cough of laryngitis.

Warmth. This is a valuable factor in relief. It is not unusual for patients to remain for hours without coughing and, on getting out of a warm bed, be seized promptly with a paroxysm. Ambulatory cases that dress warmly during the day and cover well at night are sometimes only troubled while dressing and undressing morning and evening, when the body is exposed to chilling.

Fresh Air. It has been claimed frequently that the fresh air treatment of pneumonia and tuberculosis reduces the cough by one-half. In some cases unmodified cold air seems to be a disadvantage, but it is certain that sufficient fresh air has a markedly beneficial effect.

Diet. Cough may be benefited directly and indirectly by the proper manipulation of the diet. This is particularly true where the pharynx is involved. In any event the avoidance of over-filling the stomach and proper attention to the digestion may be of benefit. In chronic cases cold fruit-drinks and warm milk-drinks are often of benefit. Sometimes the patient can give information as to which gives the most relief. One is frequently able to reduce the necessary medication by these measures. It is an old custom for patients to put an orange by the bed at night and, when the desire for coughing is felt, to take a sip of the orange juice.

Another common practice is to take some fruit juice, such as lemon or orange, saturate it with sugar, and let the patient take a sip at frequent intervals. A spoonful of sugar will often be of benefit. Dry foods such as toast, may cause trouble through particles being inspired, particularly if there is nasal obstruction that interferes with breathing through the nose. In some cases, particularly in the convalescence from pertussis, frozen food, as ice cream, may bring on a paroxysm of coughing.

Local Applications.—Mustard poultices sometimes seem to be of value. A satisfactory formula is one tablespoonful of mustard, eight tablespoonfuls of flour, the white of one egg and water. This is spread upon a thick cloth and the face of the poultice covered with cheesecloth or muslin, so that it can be easily removed. It is applied to the front of the chest until redness is produced, usually about 15 to 30 minutes, and then applied to the back of the chest for the same length of time. The skin should be thoroughly cleaned and cold cream applied. The following formula is frequently employed:

℞		or	
Olei Terebinthinæ,	f℥j	30	0
Spir. Camphorae,	f℥j	30	0
Olei Olivae,	q.s. f℥iv	120	0
M.			

Sig.—(Shake-label.) Apply on flannel as directed.

This is used to moisten a flannel chest protector and probably is of benefit principally by the patient inhaling the vapors. Various proprietary remedies are often used. These depend mainly on menthol, camphor, and other volatile constituents and may be of value. They certainly do no harm, if properly employed.

Inhalations and Sprays. In some cases benefit will be obtained by the use of the following inhalation:

℞		or	
Mentholis,	ʒj	4	0
Camphoræ,	ʒj	4	0
Tinct. Benzoini Co.,	q.s. f℥ij	60	0
M.			

Sig.—Use a teaspoonful to a pitcher of hot water as an inhalation.

This is best employed by putting a teaspoonful in a vessel of boiling water. The vessel should be placed near the patient's head, but a little lower; then, both the vessel and the patient's face are covered with a paper, or some other material in the form of an inverted trough, so that a current of the warm, moist, medicated air will be carried across the patient's face. The following spray is sometimes of value:

℞		or	
Camphoræ,	gr. iv		25
Eucalyptolis,			
Ol. Pini Pum.,			
Ol. Menth. Pip.,	āā gtt. iv		25
Petrolati Liq.,	q.s. f℥iv	120	00
M.			

Sig.—Use in an oil atomizer as directed.

The patient should inhale while using this. It may be used alone or after the inhalation previously suggested.

Another practice that has been used for generations is to place a blanket near the patient's head and moisten it with oil of turpentine.

Internal Medication.—In this type of treatment, the character of the cough and the desired results should be carefully considered. In some instances it may be best to suppress the cough, as when it is non-productive and serves no useful purpose. In other instances, it may be desirable to render the secretions more easily removable, thereby reducing the effort to get rid of them. Again, it may be best only to modify the severity of the cough. One of the most valuable agents for this is codeine. It is particularly serviceable when the cough is of marked severity, or when it is associated with much discomfort, as in pleurisy. When it is desired to render the secretions more fluid, the citrates and ammonium chloride may be of value. When the cough is non-productive, particularly where nervous instability is a factor, the bromides may give relief. When it seems advisable to lessen the secretions of the bronchial passages, such agents as terpin hydrate may be employed. The following prescriptions are typical of the manner of ordering some of the combinations in common use; these are based on adult dosage.

℞		or	
Ammoni Chloridi,	ʒj	4	0
Sodii Citratis,	℥j	30	0
Syr. Acidi Citrici,	f℥j	30	0
Liq. Potas. Citratis,	q.s. f℥vj	180	0

M.
Sig.—Tablespoonful in fruit juice every two to four hours.

℞		or	
Ammonii Bromidi,	ʒiiss	10	0
Spir. Chloroformi,	fʒiv	15	0
Tinct. Opii Camph.,	fʒvj	22	0
Syr. Tolu,	q.s. f℥iv	120	0

M.
Sig.—Teaspoonful every two to six hours.

℞		or	
Elix. Terpin. Hyd. cum Cod.,	f℥iv	120	0

Sig.—Teaspoonful in water every two to six hours.

OTHER SPECIFIC INFECTIOUS DISEASES

MEASLES

General Statement. Definition.—Measles is an acute infectious disease characterized particularly by the involvement of the mucous membranes of the upper respiratory tract and the eyes, and by a characteristic eruption of the skin.

Incidence.—All races, ages, and conditions of people are affected. The disease is rare in infancy, particularly under six months of age, and relatively so during the entire first year. The apparent immunity of adults is probably due to previous infection or to natural immunity; that is, all those who are susceptible to the disease usually acquire it in early life. One attack often confers permanent immunity, but it is not unusual for a patient to develop the disease two or three times. In many of these cases of supposedly repeated attacks, it is highly probable that one or more of them represent errors in diagnosis, as there are other conditions that more or less closely resemble measles and might be confused with it.

Etiology.—The particular organism has not yet been isolated, though the disease presents every characteristic of a bacterial infection.

It is probably transmitted by means of the infectious organisms being conveyed in the secretions from the upper respiratory tract; it is, therefore, communicated directly from person to person, and at most very infrequently through an intermediate source.

It is more infectious during the early stages when the coryza is most pronounced. With the subsidence of this stage, the infectiousness gradually lessens, and it is improbable that it persists more than ten days or two weeks.

The incubation period seems to be from seven to eighteen days with a probable average of ten or twelve.

Course and Prognosis.—Measles is usually a comparatively benign affection. The source of danger lies either in the complications resulting from the disease or in the patient being the victim of some previous condition that has lowered resistance. For some reason that has never been entirely understood, the disease often has a very high mortality in institutions for the care of young infants. It is especially to be dreaded for young children who are physically below par or those who show faulty development, as congenital heart disease. It is also particularly serious in children whose vitality has been reduced through recent illness; for example, where measles follows closely upon whooping cough. The mortality is high during an epidemic of influenza and the danger of an influenza patient contracting measles or a measles patient contracting influenza is sufficient to justify all possible precautions. Among people who have not been previously affected with measles as, for example, some of the savage races, the disease is said to be particularly fatal.

Symptoms and Diagnosis.—It is of much importance both for the protection of others, and for the care of the individual patient, that a diagnosis be made early. Unfortunately there are often no definite diagnostic findings early in the disease, and the physician has to evaluate what evidence he can secure.

History. Where a patient has been exposed to the infection and gives a definite history of not having previously had the disease, any evidence of coryza should be regarded with suspicion and at least a tentative diagnosis of measles made. This is especially true during the course of an epidemic.

Epidemic Characteristics. In measles, as well as in some other conditions, an epidemic may carry distinct characteristics, such, for example, as a tendency to certain complications, or pecularities in the character of the eruption, and often there is a definite tendency with regard to severity. These characteristics should be kept in mind both in diagnosis and treatment.

Onset. There is often a preliminary period of malaise and general discomfort that may precede the attack proper. In the majority of cases, however, particularly in children, the first evidences of the disease are sneezing, cough, conjunctivitis, and other characteristic manifestations. The onset is usually rather abrupt, though it is rare for it to be ushered in with convulsions.

Fever. For the first few days the temperature is usually rather high. There is, as a rule, an epidemic consistency in this symptom, that is, the average will be higher in some epidemics than in others. There is a tendency to a remission about the second day of the disease; the secondary rise being somewhat coincident with the skin eruption. A temperature of 104 or 105 is not unusual and in some epidemics is the rule. This usually subsides gradually from about the fifth to the seventh day, and corresponds with the clearing up of the other symptoms such as the eruption.

Coryza. This is one of the first manifestations. There is usually sneezing and a rather profuse nasal discharge, that may be excoriating in character, though marked irritation is rare.

Cough. At first this is of a short barking type, is non-productive, and may have a croupy quality. Later on its tendency is to become productive. It may persist after the subsidence of other symptoms; in fact many patients are left with a cough that persists for weeks.

Eyes. There is practically always a pronounced conjunctivitis. There is usually considerable discharge which later becomes mucopurulent in character, sometimes gluing the lids together. Photophobia is almost constant.

Koplik's Spots. These are among the evidences that may be found early in the disease by an investigation of the mucous membranes of the cheeks and throat. They may sometimes be observed by artificial light, though it is always best to use direct daylight, and often this is the only way they may be definitely discovered. As usually seen they are small red areas showing a pearly white center, and are most evident on the mucous membrane of the cheeks in the region of the upper molar teeth.

Eruption. This usually appears on the third to the fifth day, averaging probably about the fourth. It usually appears first about the face and neck, gradually spreading over the body, the extremities being the last affected. It lasts from two to five days, gradually subsiding. This initial appearance is of reddish colored macules that disappear on pressure; these are at first discrete, but later some usually coalesce, particularly in certain areas. As a rule the general discrete character of the lesions is maintained. As the eruption becomes established, the tendency is for it to take on a more or less papular character; in some epidemics this is more pronounced than in others. There is usually not much local discomfort during the active stage of the eruption, but as it subsides and desquamation sets in, there may be considerable itching, unless the case has been carefully handled.

Differential Diagnosis.—Among the conditions from which measles must be differentiated are scarlatina, German measles, drug eruptions, and syphilis.

In scarlatina, the typical eruption has the appearance of light colored configurations or spots on a red base; measles, especially in the areas where lesions have not coalesced, appears as a reddish colored eruption on a white base. The Koplik's spots, the rhinitis, and the conjunctivitis are absent in scarlatina, while anything resembling the scarlatina sore throat is rare in measles. The history of exposure is, of course, of value.

German measles is to be differentiated largely through the relative absence of the characteristic symptoms of measles, such as Koplik's spots, rhinitis, and conjunctivitis, and the tendency in German measles to glandular enlargement in certain areas. The character of the eruption can usually be differentiated readily; and the general course of the disease is different.

Various drug eruptions may closely simulate the skin eruption of measles, but they lack the other symptoms. They are usually rather scarlatiniform in character, with the exception of those from the iodides or bromides, which are seldom of a type to cause confusion.

Syphilis is sometimes confusing where the other characteristic evidences are absent. The history of exposure or a primary lesion, the age of the patient, the absence of coryza and Koplik's spots, the character of the eruption, and the laboratory tests all give data that, when properly considered, should establish a diagnosis.

Prophylaxis.—This will be discussed later under the general care of the patient. It is well to emphasize the necessity of preventing children acquiring the infection, and carelessness or indifference on the part of parents should be unqualifiedly condemned. It is not unusual in the course of a mild epidemic to find parents actually exposing their children, with the idea that they must sooner or later have the disease, and it is better for them to acquire it when it is running a mild course. There is no disease to which children should be exposed with the possible exception of mumps.

Treatment.—There is no specific and in the majority of instances treatment consists in contributing to the comfort of the individual, giving symptomatic relief, preventing complications, and protecting others.

General Care.—This is by far the most important phase of treatment and every case, no matter how light, should receive careful individual attention. It is not unusual to hear physicians condemned for making more than one or two visits, but these patients should be under professional observation throughout the febrile period, and convalescence should be carefully supervised.

Isolation. This should be as complete as possible, and all persons who have not had the disease should be especially excluded. There is not the necessity as in scarlet fever to take the rigid measures to prevent intermediates from transmitting the infection. In most communities children who have previously had measles are allowed to attend school and suffer no quarantine restrictions. They should, however, be excluded from the sick room and prevented from coming in contact with any infected material. Members of the household, particularly children who have not had the disease, are at least potential patients, and may transmit the disease after they have themselves acquired it, but before they have developed sufficient symptoms to call attention to their being infected. They should, therefore, be kept under some quarantine restrictions. It is well to explain to the family that while the disease in their healthy robust child will probably amount to little beyond a transient inconvenience, other children less fit physically may be given the infection with disastrous results.

Treatment Quarters. A room should be selected that will admit of isolation, particularly one that will not have to be used as a passage way to other parts of the house. There should be freedom from noise, the windows properly shaded, and sufficient ventilation, without drafts. In cold weather an open fireplace is desirable, as it not only furnishes heat but increases ventilation. Excessive darkening of the room is unnecessary and probably inadvisable.

Clothing. Clothing and bed covering should be such as to keep the patient comfortably warm. Excessive covering tends to cause restlessness. We can be guided in this by the habit of the patient, and where possible it is better to permit the use of the same type of sleeping garment to which the individual has been accustomed; this does not apply in the case of the sleeveless and neckless gowns that are now so commonly worn by girls. The arms and chest must be adequately protected and often this can be best done with older patients by adding a pajama coat to the usual nightgown.

Nursing. Careful nursing is of importance both for the comfort of the patient and to prevent complications. There is an unfortunate tendency to neglect these cases as the disease is not often serious, but as a matter of fact unusual care is needed, particularly in the case of children. Someone should be constantly present. The nurse should not come in contact with susceptible individuals, and while in the sick room should wear a gown and cap, and on leaving the room should discard these and thoroughly cleanse her hands and face. It is seldom that a physician wears a gown when attending a patient with this disease but it is a practice that entails very little inconvenience and certainly contributes to safety.

Frequent Examinations. The usual sources of trouble are involvement of the lungs and ears, and it is highly desirable, at least during the period of high fever, that the chest and ears be carefully examined every day and the proper measures instituted upon the first evidence of complications.

It is needless to say that the patient should be kept in bed throughout the entire febrile period and for a time afterwards depending on the severity of the illness.

Baths. There should be a warm sponge bath every day but under all circumstances the patient should be protected from chilling during the process of bathing.

Mouth. The mouth should be carefully cleansed at least three times a day. It is probably better where patients have been accustomed to some special mouth wash to let them continue to use it, if there be no contra-indication. It does not seem advisable to try to impose a preparation such as Dobell's solution when there are so many pleasantly flavored ones on the market that answer equally as well or better, particularly if the patient has been accustomed to their use.

Diet.—The febrile period in uncomplicated cases is a matter of a few days only and during this time there is almost complete anorexia. It is probable that this disinclination for food should be regarded as a provision on the part of nature to protect the individual, and that efforts at forcible feeding serve no useful purpose but are rather fraught with danger. The mucous membranes are more or less extensively involved and the digestive ability of the patient is lowered. Many confine the diet to hot liquids; others claim that there is no contra-indication to iced beverages, and give sherbet and ice cream freely. My rule has been to give as much of the food warm as can be conveniently arranged, but to allow cool drinks as wanted. A typical diet would be as follows: Water, diluted fruit juices, malted milk or similar preparations made up with water, simple strained soups and broths, and for older patients tea and coffee. Soups and broths should be cooked with some cereal, as rice or barley, and one-half milk or one-fourth cream may be added. These liquids may be served hot or cool but are not served with ice. Where a child has been accustomed to some prepared food, it may be continued as the main article of diet, unless there is some reason to the contrary. These are prepared weaker than the child has been accustomed to, as no effort is made to keep up a high caloric intake. As the fever subsides, other articles of food may be added, such as milk, gelatin, custard, cream of wheat and milk toast.

Symptomatic Treatment.—It is here that the physician has his greatest opportunity to be of benefit.

Fever. It is seldom that treatment is necessary to combat high temperature. In the case of children with a history of a tendency to convulsions with fever, it may be advisable to use measures to combat hyperpyrexia but in the majority of cases nothing further than the general care of the patient as previously outlined is indicated. An ice bag to the head may be of value. Sometimes a warm sponge bath may be indicated; the relief is not as prompt but the value in reducing temperature is certain. At times acetylsalicylic acid in small doses may be indicated, in fact, there is no contra-indication to its use here, if it is certain that there is no pulmonary complication. It may be given in small doses every two or three hours, until the desired effect has been obtained, when it should be promptly discontinued.

Cough. It is a common custom to use citrates as a routine in the treatment of this disease; they may be given as follows:

(For a child six years old)

℞		or	
Sodii Citratis,	ʒiv	15	0
Syr. Tolu,	f℥j	30	0
Liq. Potas. Citratis,	f℥iv	120	0
M.			

Sig.—Teaspoonful in water every two to four hours.

Clinically they seem to be of benefit. When the cough is of sufficient severity to interfere with rest, small doses of codeine may be used, but only in sufficient amounts to modify the severity of the symptoms. Local measures have been suggested, such as oil sprays and inhalations. At times the following may be of value:

℞		or	
Camphoræ,	gr. iij		2
Eucalyptolis,			
Ol. Pini Pum.,			
Ol. Menth. Pip.,	āā gtt. iij		2
Petrolati Liq.,	f℥iij	90	0
M.			

Sig.—Use to spray nose and throat.

The Nose. The coryza is a self-limited process and does not seem to be much affected by treatment. The spray as suggested in the preceding paragraph may be of value. In the case of very young children, this oil solution may probably be best administered by dropping it into the nares. If there is irritation of the margin of the nose or upper lip from the secretions cold cream or bismuth paste should be freely applied. A ten per cent solution of neosilvol dropped into the nose or a one per cent solution of mercurochrome applied with a swab will contribute to comfort.

The Ears. There is a tendency to otitis and in some epidemics this complication occurs with great frequency. In some epidemics it is mild in character, while in others a large percentage of the cases involved may have to be treated surgically. As previously suggested, the ear should be examined at every visit of the physician. In case of mild involvement the following prescription may be used:

℞		or	
Atropinæ Sulph.,	gr. ⅕		01
Cocainæ Hydrochlor.,	gr. iij		20
Phenolis Liq.,	♏x		60
Glycerini	q.s. f℥ss	15	00

M

Sig.—Use in ears as directed.

In case of bulging, the drum should be promptly opened.

The Eyes. Conjunctivitis is always present. There is considerable diversity of opinion as to the advisability of keeping the patient in a darkened room. It is probable that during the stage of much involvement it is better to have the light moderately shaded, and the bed so placed as to prevent what light is admitted from shining directly on the patient's face; or arrangements may be made partially to screen the bed. Even during convalescence reading should be prohibited. Much relief can be secured by placing cold wet cloths over the eyes; a normal saline solution is probably best for this purpose. The mucopurulent discharge should be removed with normal saline or mild boric acid solution. A 5 per cent solution of argyrol in distilled water or a weak zinc sulphate solution sometimes contributes much to relief. Where there is a tendency for the lids to stick together, plain sterile petrolatum should be used freely.

Skin. Probably the most satisfactory treatment for the skin is to use one or two warm sponge baths daily. As soon as there is evidence of discomfort these baths may be followed by a witch hazel rub and this by plain cold cream. The patent toilet preparations should not be used, and it is better for the physician to write a prescription for the ointment of rose water, which is the proper name of the preparation desired.

Nervous Phenomena. These are not usually marked, and in the majority of cases no special treatment is necessary. Where there is restlessness or delirium from high temperature, acetylsalicylic acid may be given. In selected cases the bromides or barbital may be indicated. It will be found, however, that if the general care of the patient is properly directed, medication for this symptom is seldom necessary. Of particular importance from this standpoint is instituting from the very beginning the necessary quiet, rest in bed, fresh air, comfortable clothing, large amounts of fluids, and proper elimination.

Convalescence.—There is not the necessity in measles for a prolonged period of rest as there is in such diseases as scarlet fever and diphtheria, but in many cases the patient recovers from the stormy period much exhausted and generally in need of proper supervision. As soon as the digestive ability will permit, the diet should be rapidly increased. In good weather the patient should have the benefit of fresh air and sunlight, but care exercised not to permit too early a return to activities, particularly where exposure would be entailed. In some cases tonics are indicated.

Complications.—These constitute the greatest menace in this disease, and, while a great number are possible, many of them are so infrequent as to hardly justify discussion.

Pneumonia. This is the most common cause of serious trouble. As previously suggested, the patient should be repeatedly examined with this complication in mind; on the first evidence of possible pneumonia, proper measures should be instituted. The treatment is practically the same as for the same condition arising from other causes. Persistently high temperature or a sudden rise of temperature after the time for such a symptom should be regarded as suspicious.

Otitis Media. In some epidemics this is a very frequent complication. As previously suggested, the physician should be constantly on the lookout for its appearance. The ears should be examined at every visit, irrespective of whether the patient complains of pain. The treatment would not differ from that of this condition arising from some other cause.

Tuberculosis. There is certainly a tendency toward the development of tuberculosis after measles. Any protracted cough, persistent temperature, or delay in the patient's returning to normal should be regarded as suspicious. It is probable that the majority of cases of tuberculosis following measles are the result of a latent infection being converted into an active process.

Noma. Fortunately this is relatively a rare complication. In my personal experience every case of noma that has come under my observation has resulted from measles. The treatment of this condition following measles should not differ from that of the same condition arising from other cause. It is almost uniformly fatal.

GERMAN MEASLES (RUBELLA)

General Statement. Definition.—Rubella is an acute, infectious, eruptive disease of unknown etiology. The course somewhat resembles measles, but differs from it by being much milder in all its manifestations, and entirely free from its complications.

Incidence.—No group is immune, but very young children are not often affected. There is probably a greater tendency for adults to be involved than is the case with common measles, but the disease is confined largely to the first three decades of life. It is a much lighter infection than common measles and widespread epidemics are rather rare.

Etiology.—It is probably transmitted in the same way as common measles, that is through the secretions of the mouth and upper respiratory tract. It is at least rare for an intermediate person to carry the disease, though such seems possible.

Course and Prognosis.—The incubation period is between ten and twenty days, with a probable average of about two weeks.

One attack seems to confer permanent immunity; also many persons have a natural immunity, as only a small proportion of those exposed develop the disease.

The disease is important largely through the inconvenience it entails, particularly among school children. There is practically no mortality or complications of a serious nature.

Symptoms and Diagnosis.—In the course of an epidemic there is very little difficulty in establishing a diagnosis, unless common measles be prevalent at the same time. The manifestations are so mild that in a fairly large percentage of the cases a physician is not called; if he is, but does not see the case early, it is sometimes impossible to establish a diagnosis on the evidence presented.

Onset. This may be sudden though it is seldom violent. There may be a prodromal period of malaise, anorexia and general discomfort followed by the beginning of the catarrhal manifestations, such as sneezing and other evidences of coryza, usually of a fairly mild type.

Fever. The temperature is not often very high, usually running between 100 and 102; it seldom lasts more than a few days, and may be so slight as hardly to give evidence of its presence unless a thermometer is used.

Prostration. This is remarkable for its absence. Even in the face of relatively high temperature there is seldom any appreciable degree of prostration such as is encountered in some of the other eruptive diseases.

Pain. Aside from a certain amount of general discomfort and a moderate headache, there is seldom much pain, even the headache may be very transient in character.

Glands. There is often an early involvement of certain glands, particularly the posterior cervical. This is one of the characteristic features of the disease. The enlargement is seldom excessive, is self-limited, seldom the cause of much discomfort, and suppuration is practically unknown.

Eruption. The eruption is less marked than in measles and more transient. The individual lesions are smaller and less pronounced; in character they are more papular than in common measles, where they are macular, particularly at first. There is a marked tendency for the skin lesions to be confined largely to the abdomen and inner side of the thighs.

Differential Diagnosis.—The most common diseases from which German measles would have to be differentiated are common measles, scarlatina and drug eruptions. The differentiation from common measles has been suggested in the preceding paragraph. In scarlatina, there is not the characteristic enlargement of the posterior cervical glands, and the scarlatinal eruption has the appearance of light colored configurations on a red, or rather a magenta colored ground, while rubella shows a colored eruption on a white ground. The sore throat of scarlatina is absent in rubella. Drug eruptions are more apt to be scarlatiniform in type except those of bromides and iodides, which are so characteristic as seldom to lead to confusion. Drug eruptions would also fail to show the other evidences of rubella, such as the glandular enlargement, fever and coryza.

Prophylaxis.—This is the same as for common measles.

Treatment.—There is no specific; in fact treatment of any kind is usually unnecessary. The effort should be to promote the comfort of the patient and to prevent the infection of others. The selection of the room and arrangements for nursing should be dictated by the same considerations that obtain in other cases of infectious diseases. The patient should have a comfortable well situated room which can be properly heated if the weather is cold. Covering and clothing should be comfortable. Warm baths should be given daily. Elimination should be maintained, but without violent purgation.

Diet.—The fact that the disease is mild should not cause one to neglect the attention to diet. The short course renders high caloric feeding unnecessary, and during the few days of disability, an effort should be made to keep the patient comfortable only. During the stage of fever, the diet may consist of such items as, water, carbonated drinks, diluted fruit juices, strained soups and broths, malted milk (or similar preparations), buttermilk, and tea or coffee if the patient has been in the habit of using them. As the fever subsides, the diet may be increased by the addition of such articles as milk, milk toast, well cooked cereals and fruits.

Symptomatic Treatment.—The uncomfortable symptoms are few and rather transient in character, but even a small amount of discomfort should be alleviated if possible. If there is much fever or pain, acetylsalicylic acid may be given in sufficient amount. Drugs like codeine are seldom necessary, but could be used with impunity if needed. The citrates are often given as a matter of routine. The following prescription will illustrate:

(For a child six years old)

℞

		or
Sodii Citratis,	℥j	30|0
Syr. Tolu,	f℥j	30|0
Aquæ,	q.s. f℥iv	120|0

M.

Sig.—Teaspoonful in water every two to four hours.

Convalescence. As soon as the fever subsides, the patient may be allowed to get up, the diet increased, and as a rule the individual is ready to resume normal activity in a week or ten days after the onset of the disease.

Complications.—Complications are seldom, if ever, present. It is probable that in those cases in which complications have been reported they were caused by some other condition.

SCARLATINA

General Statement. Definition.—This is an acute, infectious disease of unknown etiology, and characterized by certain rather definite phenomena including fever, sore throat and a somewhat scarlet colored eruption followed by rather extensive desquamation. The common name "scarlet fever," which is often employed to designate this disease, is usually understood by the laity to be a different condition, the impression being that "scarlatina" is a modified form of "scarlet fever."

Incidence.—The disease is known practically everywhere and no race or class of society is immune. As it is contagious there is a tendency to outbreaks which sometimes attain epidemic proportions. It is very rare in infants and adults. The period of greatest susceptibility seems to be at about seven or eight years of age. Only a certain percentage of those who are exposed contract the disease.

Etiology.—The specific organism has not been isolated, but the character of the disease and other evidence has given rise to the belief that it is probably a streptococcus.

The mode of infection has not yet been positively demonstrated. The weight of evidence favors the belief that the secretions of the upper respiratory tract, particularly the nose, mouth and pharynx, contain the organisms and that they are spread by coughing, sneezing, expectorating or by contact in any way, direct or indirect, with these secretions. Despite the popular belief to the contrary, it has been fairly well demonstrated that the particles of desquamated skin are not infective unless they have come in contact with the infected secretions.

Course and Prognosis.—One attack seems to confer complete immunity, and it is highly possible that those cases which give a history of repeated attacks are really describing some form of recurrent scarlatiniform erythema.

The period of incubation has been variously estimated at from one day to three weeks. I am inclined to agree with Woody and others that from one to eight days is more nearly correct.

There seems to be some relation between the length of the period of incubation and the severity of the attack, the more serious cases probably having the shorter incubation period. The most severe case I have ever had under my observation seemed to develop within twenty-four hours after exposure.

In reading the literature on this subject I have been much impressed by the difference between the disease as many others have described it and as I have seen it in my personal practice, and it has seemed to me possible that there may be some undetermined influence that modifies the course in certain localities.

Some writers use such terms as the "dread disease" and draw rather an appalling picture of the condition as they have observed it.

In more than fifteen years' practice in New Orleans, I have had the opportunity of seeing many cases of scarlatina. During this time there have been several epidemics that assumed considerable proportions.

In my private practice, I have had one possible case of scarlatinal nephritis. At least it was supposed to be following scarlatina, as the history was that the child had been sick for two or three days, but not sufficiently so to be confined to bed. During part of this time, a slight redness of the skin had been noticed. About two or three weeks later, a typical acute nephritis developed, ran rather a mild course, and ended in a complete recovery.

I saw one case of endocarditis that died within a few hours after a physician was first called. The family were rather ignorant and the history was very uncertain. As nearly as it could be obtained, sometime preceding the heart condition, the patient had a slight indisposition, during which there was evident a more or less distinct rash and some sore throat.

In my entire group of cases there has been only one of severe scarlet fever. This showed some adenitis, without suppuration; some otitis media that cleared up under palliative treatment; there was some hemorrhage from the mucous membranes; the temperature ranged around 104 for about a week, ofter which the case began an uneventful convalescence.

Aside from these cases, I have observed none that presented any complications worthy of note. There have been no suppurating glands or ears; no nephritis; no gangrenous throats; no nasal complications of even approximate severity; no arthritis, except a mild transient discomfort and no heart complications. In fact, the greatest difficulty has been to reconcile a perfectly comfortable and apparently well patient and the patient's family, to the inconvenience of quarantine restrictions.

There has been usually a few days of throat discomfort and often some evidences of membrane, a slight fever of from two to five days duration, more or less skin eruption followed by desquamation, but practically nothing in the way of the nervous phenomena and the various other symptoms that have seemed to be so common in the past.

In New Orleans during 1926 there were 432 cases reported with 7 deaths. It should be remembered that these deaths include those cases with post-scarlatinal complications that had been sent here from the surrounding territory. Excluding these, the mortality has been negligible. This mortality is further modified by the fact that a very large percentage of cases are not reported, many of them being so mild that they were not even recognized as such by the family and medical attention not secured or only seen by a physician after the characteristic symptoms had subsided making a diagnosis impossible.

Symptoms and Diagnosis. Onset. The disease is usually first evidenced by fever, nausea, sore throat and a skin eruption, generally occurring in the order named. One or more of these symptoms may be absent or so slight as to be unnoticed. The nausea may be rather severe, the vomiting persisting for two or three days. In a mild case the temperature ranges about 100 to 102; in severe cases, it may reach 104 or 105. In the disease, as I have observed it, the temperature usually subsides within two to five days. The throat shows a general redness, there is usually some evidence of membrane and in severe cases this may be quite extensive. The tongue is at first coated, later taking on a kind of strawberry appearance. In children the condition may be ushered in with a convulsion.

The Eruption. This may be very slight, so slight that unless the patient is seen early, it may be impossible to make a diagnosis from this evidence. It may be general over the entire body or may be confined to certain areas. It is usually more pronounced over the upper part of the chest, the lower abdomen, the groins and the thighs. The appearance is more that of a red skin with small light colored areas. The color is really more of a magenta than a true scarlet. Dyer was wont to describe the appearance as that of "magenta colored rose leaves spread on a wall and viewed from a distance."

Desquamation. This is usually rather extensive. The process lasts for from one to several weeks, the hands and feet being the last to clear.

Glands. There is usually some enlargement of the lymphatic glands. In the severe form of the disease there may be considerable adenitis, even going on to suppuration.

Ears. There is a tendency to otitis. While it may be severe, usually it is of a mild, transient character. This condition may develop practically without pain. During the course of the disease, and particularly during the early days, the ears should be examined daily.

Laboratory. There is often an albuminuria during the early stages of the disease. This is not to be confused with true nephritis which is a complication that may be encountered during the latter stages. The blood shows a leucocytosis with a high neutrophile count. After the first few days, there is also an increase in the eosinophile count.

Skin Test. The Schultz-Charlton reaction is carried out by the intradermal injection of blood serum from a convalescent patient or one who is immune (one who gives a negative reaction to the Dick test). There is a blanching of the eruption at the site of the injection if the condition is scarlatina.

Differential Diagnosis.—The diagnosis depends on the history of exposure, if such can be obtained; a rather acute onset, particularly with nausea and vomiting, fever, sore throat and the characteristic eruption. Probably the condition most frequently confused with scarlatina is scarlatiniform erythema of gastro-intestinal origin. Sometimes drug euptions may present a confusing similarity. Dengue fever in its early stage may present a condition that is sometimes difficult to differentiate from scarlatina.

Measles shows coryza, rhinitis and conjunctivitis. The eruption appears as reddish spots on a white skin. Scarlatina appears more to be light colored configurations on a red skin. Measles does not show the characteristic sore throat and Koplik's spots are usually present. Scarlatiniform erythema may give a history of preceding attacks, and the throat symptoms of scarlatina are absent. Drug eruptions do not present the sore throat, and fever is not usually present, also there is often a definite history of idiosyncrasy to some drug that has been taken recently.

Prophylaxis.—In hospitals that treat acute infectious diseases, isolation is well provided for.

In cases treated in the home, no effort should be spared to carry out every possible measure that would tend to prevent the infection of others. These matters will be discussed under the head of treatment. Recently Dick and Dick have perfected a plan of testing by which the susceptibility or immunity of an individual can be demonstrated and active or passive immunity conferred, when indicated.

The Dick test consists in injecting intradermally a filtrate from a culture of a hemolytic streptococcus, a positive reaction being indicated by an area of redness and usually some swelling and tenderness developing. This shows that the individual is susceptible to the infection. Active immunity is developed by injecting this toxic material. The usual course is three injections at intervals of from seven to ten days. For a child under 12 years, the doses are 100, 250 and 250 skin test doses. Older children are given 100, 250 and 500 skin test doses.

Passive immunity is conferred by injecting the serum from a horse sensitized against these streptococci. The average dose is from 10 to 30 cc. or a corresponding amount of the concentrated serum may be used.

Treatment. General Care.—The patient should be completely isolated and treatment quarters selected with this in view. Where possible, it is better to have two rooms and a bath devoted to the care of the case, one room for the patient and one for the nurses when off duty, the bath room to be used exclusively by those in charge of the patient.

The room should be selected also from the standpoint of ventilation, light and proper heating. Where possible, an open fireplace is desirable as it favors ventilation, affords proper heating facilities and aids in the disposal of infected material.

All unnecessary furnishings should be removed from the sick room, such, for example, as window curtains, dresser scarfs and pictures.

When the patient is a child, only such toys should be allowed as can later be destroyed or properly disinfected, such as articles made of rubber or china.

Nursing. It is certainly desirable to have two nurses, if possible and it is a prophylactic measure of distinct advantage to have the nurses sleep on the premises. This lessens the chances of their spreading the infection during their periods of off-duty. Nurses are only human and in spite of all instructions to the contrary, when they leave a case they are apt to attend picture shows and entertainments and mix up with people generally very much as if they were not handling a case from which they might be carrying infection.

Where two rooms and a bath are used for the management of the case, the nurse off duty can sleep in one of these rooms and both can use it as a dressing and recreation room. They can take periods of outdoor recreation, during which they should manage to avoid contact with others, particularly with children.

Where trained nurses are not obtainable and some member or members of the family are to take care of the case, it should be arranged so that they may devote their entire time to this and not mingle with the rest of the household. It is particularly desirable that they do not come in contact with children or have anything to do with the preparation of food for others.

The frequent practice of allowing the nurse to go to the kitchen and prepare the food for a scarlatina patient should, of course, be prohibited.

Excellent service can often be secured by having the mother or some other intelligent member of the household take entire charge of the case and isolate herself from the rest of the family.

The danger of an adult's contracting the disease is so slight as to be almost negligible; at least this has been my experience with this disease. But a condition of immunity does not always obtain; for example, there were many severe outbreaks among the soldiers during the last war.

All food should be prepared and brought to the nurse. Separate vessels, knives, forks, etc., should be used exclusively by the patient and attendants and sterilized in the quarters set aside for the treatment. It is better that the food should be transferred to these separate containers, or where possible brought up in paper or cardboard containers that may be destroyed.

When the nurses leave the quarters that have been isolated for treatment, they should take every care in regard to changing clothes and disinfecting themselves.

The physician on visiting the case should remove his coat, pull up his sleeves and put on a gown that will reach from the chin almost to the floor and, on leaving the case, he should remove the gown and thoroughly cleanse his face and hands. The gown should be dipped in a bichloride solution or some other disinfectant and hung up to dry.

The gown should not be touched by anyone else until the physician again uses it. Changing shoes is also a practice that is sometimes carried out and certainly has an advantage.

Where possible, the physician should arrange his visits so that he will be in the open air for some time before coming in contact with other children. It is usually recommended that a physician attending a scarlatina patient should not do any surgery or attend any obstetrical cases. It is certainly possible that by observing sufficient precautions the chances of carrying the infection can be largely or entirely done away with.

The tongue depressors, ear speculum, etc., should be left with the case. The tongue depressors may be of metal and sterilized each time they are used or of wood and burned later. The head mirror and stethoscope should be left with the case and thoroughly rinsed with alcohol after use. Test tubes and alcohol lamps should be left with the case so that the urine can be examined once a day.

All excreta, bath water, etc., should be sterilized with phenol or clorinated lime or some other material.

All clothing coming in contact with possible infection should be boiled, or otherwise disinfected. Boiling is certainly the safest and most satisfactory method.

Many have recommended that the door opening be hung with a sheet wet with bichloride solution, or some other disinfectant. This has seemed to me to be unnecessary if the patient is properly handled otherwise.

Rest. No matter how mild the case, the patient should be kept in bed and, if possible, kept quiet. A good rule is to enforce this for at least ten days after the temperature is normal. Many have recommended a much longer period.

The patient should be clothed and covered so as to be comfortably warm without being too hot. This will depend, of course, on the temperature and other factors.

Care of the Skin. The patient should have one or two cleansing baths a day. This may be followed to advantage by a witchhazel sponge and then a light massage with plain cold cream. This latter treatment has the advantage of lessening the skin discomfort and preventing dissemination of the desquamating epidermis.

The cold cream used should be the plain, official preparation and not the fancy toilet articles that are so frequently employed. It is better for the physician to write a prescription for half a pound of "Ointment of Rosewater" which is the official name of the article desired.

In an overwhelming majority of cases this is all that is needed to give the necessary amount of comfort to the patient from this standpoint.

Bowels. A mild intestinal elimination should be kept up by the use of simple laxatives, and of these liquid petrolatum is probably the most desirable. Milk of magnesia may be employed. For active purgation, castor oil is the drug of choice. Where necessary, simple, non-irritant enemas may be used, plain water or water and sweet oil being the most desirable.

Where there is a tendency to much gas, ½ fluidounce (15 cc.) of tincture of asafetida to half a gallon of plain water is usually satisfactory. If there is a tendency to diarrhea, warm cooked starch enemas sometimes will give relief.

Throat. Much has been said and written about the care of the throat and many local applications have been urged. They are no doubt useful in the severer forms of involvement.

It has seemed to me that patients have done just as well or better, and have certainly been less inconvenienced by the following plan that was in use in the treatment of diphtheria before serum was developed. During the stage of throat discomfort the following prescription is employed as the only local measure:

(For a child six years old)

℞	or		
Potassii Chloratis,	ʒss	2	0
Tinct. Ferri Chlor.,	fʒj	4	0
Acidi Sulphurosi, (H_2SO_3)	fʒj	4	0
Glycerini,	fʒiv	15	0
Aquæ,	q.s. f℥vi	180	0

M.
Sig.—Tablespoonful in water every four hours.

A drink of water is given before the medicine is administered and not after it. The medicine is given as strong as the patient can tolerate it, usually about one tablespoonful of the medicine to one tablespoonful of water.

In a condition like scarlatina or diphtheria, where there is a tendency to circulatory involvement, it is inadvisable to repeatedly subject the patient to the struggle and discomfort that is so often necessary to treat the throat locally.

Cultures should always be made in order to determine the presence or absence of diphtheria. If there is evidence of laryngeal involvement, it is always better to give the diphtheria antitoxin in large doses just as it would be used in a case of suspected diphtheria.

The Nose. It is seldom that a patient will require any special treatment of the nose. In the severe type it may be advisable to institute some measure to give relief. Mild sprays or douches may be used as Liquor Antisepticus (N.F.) or Dobell's Solution properly diluted.

Diet. The febrile period of this disease is usually of such short duration that in the majority of cases we can well afford to subject the patient to a low food intake during the stage of acute symptoms. It is necessary, of course, to individualize and to be guided very largely by the state of nutrition of the patient, by the previous history of digestive ability and by the severity of the attack. In the average case it is safe to begin with a diet somewhat as follows: Water, carbonated waters, diluted fruit juices, buttermilk, malted milk and other similar preparations (made up with water), strained soups (made without meat and cooked with some cereal as rice and barley, then strained and one-half milk or one-quarter cream added).

In the early stage of the disease, there is no objection to broths made with just enough animal matter to give flavor; for example, the feet and neck of a chicken, chopped up and boiled with rice for two hours, salted to taste and strained.

As soon as the acute febrile stage subsides, the patient can be put largely on a milk diet. A milk diet is recommended by many physicians for the entire course of the disease. The experience of many is against the use of milk in cases of high temperature, except as suggested in the preceding paragraph.

As soon as the febrile period has subsided, or practically so, the diet may be increased by milk, cream of wheat, farina, grits, soft rice, toast, etc.

The digestive ability of the patient is usually low, and as the active stage usually subsides in a few days, only in a protracted case are we justified in trying to keep up a high caloric intake.

Serum Treatment. The serum obtained from horses immunized against a scarlatinal hemolytic streptococcus is the product most commonly used. It is also on the market in the concentrated form.

Human blood serum from convalescent patients has been employed at times in the past.

Management of Symptoms and Complications.—Nausea is seldom a symptom that requires special treatment other than careful regulation of the diet and such measures as the administration of small amounts of carbonated drinks, as seltzer and sodium bicarbonate.

Severe Throat Involvement. This may assume even a gangrenous form. Various plans of treatment have been suggested. Sometimes irrigating the throat with a hot saline solution or applying a solution of tincture of ferric chloride and glycerine, tincture of iodine or solution of silver nitrate is of benefit.

Abscesses. These may require incision and treatment just as they would under any other condition.

Mouth Ulcers. The use of the potassium chlorate formula, as previously recommended, will probably lessen the tendency to this condition. Touching the ulcers with a ten per cent silver nitrate solution may give relief.

Conjunctivitis. This may be treated just as the condition would be treated if occurring without scarlatina. The use of five per cent argyrol has been recommended. The exclusion of too much light is a measure that should always be employed should this condition develop.

Hyperpyrexia. It is comparatively seldom that this requires any special attention where the case is seen early and receives the proper general treatment. Such matters as careful diet, perfect rest and quiet, fresh air, proper clothing, and proper elimination, usually meet all requirements. An ice bag to the head should, of course, be used where the temperature is excessive. Hydrotherapy in the form of sponging is the measure of major importance. We are not justified in using antipyretic drugs.

Nervous Phenomena. The development of restlessness, sleeplessness, delirium, and like phenomena may be largely prevented or relieved, by the general care of the patient as previously outlined; otherwise small doses of the bromides may be employed. Barbital for insomnia may give relief.

Otitis. As previously stated the ears should be regularly examined, as this trouble may not be evidenced by pain. Should redness be observed, the following prescription may be employed.

℞		or	
Atropinæ Sulph.,	gr. ⅕		012
Cocainæ Hydroch.,	gr. iij		200
Phenolis Liq.,	♏x		600
Glycerini,	q.s. f℥ss	15	000
M.			

Sig.—Use in ears every one to four hours.

Should indications develop the drum should be promptly incised and cared for the same as if the condition developed in the case of any other disease.

Mastoiditis should receive prompt surgical attention.

Adenitis. Some glandular enlargement is probably always present. Sometimes the condition develops to such an extent that special attention is required. Cold applications are probably the most beneficial form of treatment. These may be either in the form of wet compresses or an ice bag. Should suppuration develop, prompt surgical attention is indicated.

Arthritis. This condition should be treated as arthritis occurring under any other conditions. However, in a disease like scarlatina, that has a marked tendency to nephritis, the salicylates or other renal irritants should be used sparingly if at all and special attention given to an investigation of the urine for early evidences of trouble. In the majority of cases, the arthritis may be sufficiently relieved by local applications.

Heart Complications. It is certain that much can be accomplished in the way of prophylactic measures. A proper attention to the general care of the patient, having always in mind the conservation of the circulatory apparatus is an indispensable part of treatment. Should cardiac involvement develop, it should be treated just as the same condition developing without scarlatina.

Nephritis. This is the most common and most serious complication of scarlatina. It should be in mind from the beginning of treatment and all measures directed toward conserving the kidneys. Should it develop, it is treated just as acute nephritis developing under other conditions. (See page 358.)

Release of the Patient. As previously suggested, the patient should be kept in bed in a mild case for a minimum of ten days after the temperature has permanently subsided, in severe cases the period of rest in bed should be much longer.

The getting up should be carefully supervised, the patient being allowed to sit up only for short periods at first and these gradually increased.

In releasing restrictions we have two things to consider: First—The protection of the patient. Second—The protection of others.

From the standpoint of the protection of the patients, it is certainly desirable to keep them confined to their rooms for a minimum period of thirty or forty days. After this time excessive exercise should be prohibited for at least one or two months.

In cases of school children, they should be excused from physical exercise and forbidden to participate in games requiring effort.

From the standpoint of the protection of others, a minimum quarantine of thirty days is probably desirable.

The patient should not be released then if there are any conditions, such as discharging ears, that might be a source of infection.

Most health authorities will not permit patients to be released until desquamation is complete and the skin has returned to normal.

DIPHTHERIA

General Statement. Definition.—Diphtheria is an acute, infectious disease resulting from an invasion of the tissues by the Klebs-Loeffler bacillus. It is usually characterized by membrane formation with various constitutional manifestations as a result of the toxins of the disease. The local lesions are usually confined to the tonsils, pharynx, larynx or nose. In other words, to the upper part of the respiratory tract. They may be located elsewhere also but this is unusual.

In addition to the local involvement many structures of the body, particularly the heart and the kidneys, may be effected by the toxins absorbed from the area of local involvement.

Incidence.—No kind or condition of mankind is immune. The age of greatest susceptibility, however, is early childhood. Adults are markedly less susceptible.

The disease is active at all seasons and it is probable that the greater frequency at certain periods of the year is due to the difference in living conditions; such, for example, as school attendance and indoor social gatherings.

Etiology.—The exciting cause is the specific bacillus. These organisms are transmitted in the secretions, either from someone suffering from the disease or from a carrier. The infection may be direct or through an intermediate source.

Animals have unquestionably transmitted the disease to people, but it is probable that the most common intermediate carriers are those persons who have come in contact with cases and, without acquiring the infection themselves, transmit it to others.

Transmission may be conveyed by clothing, eating utensils, etc., that have become infected from someone carrying the disease.

Course and Prognosis.—At one time diphtheria carried a very high mortality. Laryngeal infection was almost certainly fatal. Since the introduction of the specific serum, the mortality has been so reduced that deaths at this time are largely due to insufficient serum, delayed diagnosis or other related cause.

Among the better class of patients, where the children receive more careful attention and are more directly under the care of a physician for supposedly minor ailments, the mortality is extremely low. It is not unusual for a physician to be able to state that he has been in practice for a long period of years without a single death from diphtheria occurring in his practice.

Symptoms and Diagnosis.—It should be remembered that the symptoms result from the local lesion and from the effect of the toxins.

General Symptoms.—These may be rather obscure and extremely misleading. Their indefiniteness and apparent mildness sometimes lead to disaster, except where the medical attendant is sufficiently thorough in his work to make a general routine investigation in all cases of sickness.

Fever. This, as a rule, is not excessively high; ranging in the average cases from 100 to 102. It may be rather transient and it is not unusual to find a patient normal a good part of the time even when considerable membrane is present. It may be stated in a general way that the fever is usually lower than in the other forms of severe sore throat.

Prostration. Usually the prostration is greater here than in the other forms of sore throat giving the same amount of temperature elevation. There are many exceptions to this, and it is not unusual to have a child brought to the office, apparently bright and lively, yet showing upon examination a rather extensive membrane. In some cases, particularly of the pharyngeal type, it is very difficult, in the face of the apparent well-being of the patient, to make the family understand the necessity for the rigid restrictions as to rest and quiet that are necessary for the safety of the patient.

Anorexia. There is a tendency to loss of appetite that is usually out of proportion to the temperature as compared with other forms of sore throat. Very often this disinclination to take food is largely the result of pain or difficulty in swallowing.

Pain. There may be headache or body pains, though these are not often experienced to the same extent as in the other severe types of sore throat.

Local Symptoms. Pharyngeal. The patient, if old enough, will complain of sore throat and difficulty in swallowing. Often, due to the local swelling, there will be breathing through the mouth.

Upon examination there will be found more or less local redness, depending largely upon the stage of the disease and the location of the infection. The most common site is the tonsils. From there it may spread to the surrounding structures or to the posterior pharynx. The pillars of the fauces alone may show involvement, particularly if seen early.

There will be found a characteristic whitish colored membrane that, if seen later, may have assumed a dirty gray color, or the membrane may be distinctly whitish in some areas and discolored in others. The differential points of prime importance are that the membrane is usually in large solid patches instead of scattered areas as is found in some other types of sore throat, and that its removal usually leaves a raw bleeding surface.

There is usually some glandular involvement and those in relation to the tonsils may be markedly enlarged.

There is a rather peculiar secretion of mucous, or mucopurulent matter, and the swallowing of this or the effort to expectorate it may give rise to considerable pain.

Nasal. When the infection is nasal, there is a rather characteristic nasal discharge that has a tendency to be bloody in character, is persistent, and often excoriates the skin at the margin of the nose and of the upper lip. There may be considerable dropping back of this material into the nasopharynx which may be observed upon the examination of the throat.

Upon inspection of the anterior nares with a nose speculum and of the posterior nares with a mirror, the membrane usually can be made out.

There is sooner or later sufficient obstruction of the nasal passages to cause the patient to breathe through the mouth.

There may be even early, enough impairment of the soft palate to interfere with swallowing of liquids, causing some regurgitation through the nose.

There may be, complaint of considerable local pain in the nose, though this is not usually so pronounced as in the case of streptococcal or staphylococcal infections.

There are apt to be ear symptoms, due either to an extension of the infection into the Eustachian tubes or more commonly a mechanical plugging up of these tubes, thus interferring with the ventilation of the middle ear.

Laryngeal. Usually the first symptom is a croup that is very hard to differentiate from the ordinary catarrhal, spasmodic type. There is the so-called brassy cough with horaseness, and interference with the quality of the voice sounds. Sooner or later there is more or less complete aphonia.

There is a tendency to mouth breathing, due to interference with the intake of air, and sooner or later there is both an inspiratory and expiratory dyspnea, though the inspiratory effort is the more labored. When the condition has sufficiently developed, the respiration may be decidedly noisy. One of the characteristic symptoms is a retraction of the soft parts of the chest with the inspiratory movement.

At different stages there may be a marked pallor, or considerable cyanosis.

The cough is persistent and sometimes may result in the bringing up of considerable quantities of thick, tenacious material, which may be streaked with blood.

While the differential diagnosis will be discussed later, it should be mentioned here that one of the chief characteristics of these symptoms in diphtheria is that they persist, while in spasmodic croup they are confined to the night, or at least show marked periods of relief during the day.

Laboratory Diagnosis.—The laboratory is the court of last resort in the matter of diagnosis, and tragedy may result from delay in availing ourselves of this important facility, or from failing to properly evaluate the laboratory report.

When to Take Cultures. The main trouble is not in taking too many cultures, but in not investigating in this way all cases that are even remotely suspicious. Physicians realize that very often they are accused of being alarmists when they take cultures without an evident necessity. This can be largely obviated if such precautions are made a general rule of practice and sufficient time and trouble is taken to explain this to the family.

There is a widespread impression among the laity that Boards of Health laboratories are prone to make a diagnosis of diphtheria if there is any doubt as to the nature of their findings. This practice, if it does exist, is rather to be commended than condemned as it gives protection to the public, entails only moderate inconvenience to the family, and the patient has the benefit of the doubt by receiving specific treatment. The physician should not be content with one culture in cases that continue suspicious, but should make repeated cultures until the symptoms have subsided.

A few general statements might be made, though, of course, they do not cover the entire field.

Pharyngeal. Any case showing throat symptoms, if the patient has been exposed to diphtheria, should have the benefit of a culture immediately and repeated cultures if these symptoms do not subside.

Any case that shows membrane should have the benefit of repeated cultures, no matter whether the membrane is in small patches or one or more large pieces.

Any case of sore throat, whether or not membrane is present, that does not promptly yield to treatment should be subjected to cultures.

Nasal. Any patient showing a discharge from the nose, particularly if it is mucopurulent or bloody, should have the benefit of cultures, and if the patient has been exposed to diphtheria, cultures should be made immediately.

Laryngeal. Any patient showing laryngeal symptoms, such as croup or hoarseness, if he has been exposed to diphtheria, should have a culture made at once.

Any patient showing laryngeal symptoms, such as croup, if the symptoms persist into the day time, should have the benefit of cultures.

Any case of laryngeal symptoms that shows a tendency to persist or to increase in character, should have the benefit of repeated cultures.

How to Make Cultures. It is hardly necessary to go into the minute details of the technique of making cultures, but it should be stated that sufficient effort should be made to collect the material from the site of the lesion.

In the case of the pharyngeal type, this is comparatively easy. Unfortunately, many do not make sufficiently painstaking effort to properly expose the throat and bring the swab into contact with the diseased areas. It is desirable, where possible, to lift up part of the membrane with the swab and collect material from underneath. It is better, where possible, to include in the material collected a part of the membrane.

In a case of nasal diphtheria, the procedure is often more difficult and some are content with merely collecting some of the discharge. It is desirable to use a nose specula, dilate the nares, and use the swab just as described in the directions for the pharyngeal type of the disease.

In laryngeal diphtheria, the results are far more uncertain; in fact, it is inadvisable to attach too much importance to negative findings. Only a comparatively small percentage of these cases, particularly in the early stages, give a positive report.

The tongue should be depressed and the patient made to heave, if possible and when this is done material will often be brought up from the region of the lesion, or even some membrane may be viewed and treated as in a case of the pharyngeal type of the disease.

Practically all boards of health supply, free of charge, what is called a "diphtheria culture box." This contains two sterilized tubes plugged with sterile cotton. One tube contains the culture medium and the other an applicator, made into a mop with sterile cotton.

It should be remembered that not only should the mop be passed over the surface of the culture media, but it should be replaced in its original tube, and both tubes restopped with the cotton and sent to the laboratory.

Care should be exercised not only to avoid contaminating the material sent in, but also not to infect the outside of the containers, as these are to be handled by those who may themselves become infected because of the carelessness of the physician in preparing the packages.

Differential Diagnosis.—This has been fairly well covered in the preceding paragraphs.

In the pharangeal type of the disease the principal difficulty is differentiating from follicular tonsillitis and from other types of membraneous tonsillitis, such as streptococcal sore throat. Follicular tonsillitis can usually be demonstrated to be discreet accumulations of material embedded in the crips of the tonsils.

In the streptococcal sore throat and Vincent's angina, very often repeated cultures are the only means of differentiation and in many of these cases there is always an element of doubt.

Often the safer plan is to give the patient the benefit of the doubt by employing antidiphtheria serum.

In the nasal type of the disease, the main difficulty is to differentiate from other nasal infections, particularly of the streptococcal type. Sometimes sinus involvement will present considerable difficulty in differential diagnosis.

Repeated cultures are often the only means of making a diagnosis. As a rule, other infections are not so apt to be characterized by a bloody discharge, though they may show a tendency to frank hemorrhage. The diphtheritic discharge is more apt to have a consistently brownish color, it is more apt to be excoriating in character. When in doubt, the patient should be given the benefit of the specific serum.

The pharyngeal type is the one that presents the greatest degree of uncertainty. The history of exposure is often of value, but the main difficulty is to differentiate between diphtheritic laryngitis and common croup.

The leading diagnostic points are the tendency for croup to subside after a few hours of symptoms, particularly to subside during the daytime. Diphtheria has a more persistent character, though the patient may show periods of symptomatic relief. There is usually more prostration in diphtheria and sooner or later more aphonia. The patient in uncertain cases should certainly have the benefit of the doubt and serum be promptly employed.

Prophylaxis.—This may be considered under two heads, state and personal.

State prophylaxis includes those measures that have been enacted into laws for the general protection of the public. These consist of such measures as the proper reporting of cases and the institution of quarantine. Here, as in most other instances, supervising the carrying out of these regulations rests largely upon the attending physician. Of importance also are general restrictions as individual drinking cups and the proper sterilization of eating and drinking vessels at soda fountains, restaurants, etc.

Personal prophylaxis will be largely covered in the discussion of the general care of the patient. Certain measures, however, should receive particular attention.

Isolation. Such steps should be instituted as will prevent others from coming in contact with the patient or with infected material from the patient. Definite quarters should be assigned to the management of the case and the patient strictly confined to these. The attendants should not leave these quarters except after complying with necessary precautions.

Under few circumstances should visitors be admitted. Sometimes exceptions have to be made, as, for example, in the case of the clergy or some members of the household who may have to be admitted in the face of conditions arising that make it necessary.

When exceptions to the isolation of the patient are made, those admitted should be required to conform to the necessary restrictions. These will be further discussed elsewhere.

Others in the Household. The quarantine restrictions do not interfere with the breadwinners of the household. They usually do prohibit other members of the household from unnecessarily coming into contact with outsiders. Those who through necessity are allowed to go out should be excluded from contact with the patient or with infected material as far as possible. They should also be prohibited from public gatherings, from visiting and particularly from coming into contact with children.

Cultures. The members of the household and those who have come in contact with the patient before the diagnosis was made, should be subjected to investigation by cultures. This will be further discussed elsewhere.

The advantage of sprays, gargles, or other local treatment by members of the household or physician or nurses in attendance, has never been definitely decided. It is contended that these have a tendency to lessen the chances of infection. Others contend that these measures, as usually carried out, rather lower the resistance of the normal mucous membrane. Personally, I have never employed measures of this kind for myself or advised them for others.

The Schick Test. A great advance was made in the management of diphtheria by the introduction of the Schick test. It is hardly within the scope of this article to go into details. It may merely be said that it is designed to demonstrate the susceptibility of an individual to diphtheritic infection. After an individual has been proven to be susceptible, he may either be given passive immunity or active immunity built up. If they are proven not to be susceptible, efforts at immunity are not indicated.

When to Immunize. In the case of susceptible individuals who are subjected to exposure, it is certainly desirable to build up active immunity. The desirability of testing all persons and developing active immunity in all those proven susceptible is being largely discussed. Material is now on the market, by various manufacturing concerns, prepared especially for this purpose.

The preparation known as Toxin-Antitoxin is the agent for active immunization. Its use has been thoroughly described in many recent articles and specific directions are given by the respective manufacturers.

The advisability of creating a passive immunity by the use of serum is still unsettled. My rule has been not to give an immunizing dose of serum, except in the face of certain definite indications; such, for example, as where the mother of a nursing infant has the disease, the child should be immunized; or where some one is brought into contact with a patient, and for good reason it is particularly desirable to give him protection. It has seemed to me that when the members of the household are under observation and are known to have been more or less exposed, that it is better to wait for symptoms and give the full treatment dose immediately upon the development of any evidence of a suspicious character, rather than to give a passive immunity with sera.

In my own experience I have never had a nurse or an adult member of a household, to acquire the infection from a patient under treatment, and the percentage of children of the household acquiring the infection from the patient under treatment has been so small as to be almost negligible. In those few cases where this has occurred, the condition was recognized and treated with such promptness that there was little danger entailed.

On the other hand the inconvenience from the use of serum is often considerable; not only the temporary discomfort at the site of the injection, but the serum sickness that sometimes develops later.

Another factor is the possibility of sensitizing the individual to serum and should the infection develop after a transient immunity has subsided, we have to face the possibility of more serious results developing from treatment on account the patient's having been recently sensitized.

Treatment. General Care.—In treating diphtheria we have to keep in mind several general considerations.

One is the protection of others; another is the care of a patient who is suffering from a disease carrying a high percentage of potential trouble, both immediate and remote. Therefore, no effort should be spared in arranging and supervising every detail of the general management of the case.

Room. A room should be selected that will favor the isolation of the patient as far as practicable. Where possible, two rooms and a bath should be set aside for the care of the case; one room for the patient and one for the nurses and a bathroom for the exclusive use of the attendants.

The treatment quarters should be so located as to be as free as possible from the noise of the street or from the rest of the household. It is desirable to have the room selected from the standpoints of sunlight and ventilation. Where possible, it is best to have a room that not only has the benefit of a general heating system such as hot water, or hot air, but has an open fireplace in addition, if the weather is cold. This not only lends itself to regulating the temperature of the room, but favors ventilation, contributes to the comfort of the attendants and takes care of the disposal of much infected matter in a most satisfactory way.

Nursing. Where possible, it is desirable to have two trained nurses and sufficient outside aid to prevent the nurses having to leave the treatment quarters except when they make proper preparations and leave the house entirely.

Under no circumstances should the attendants on the patient go to the kitchen to prepare food or to the refrigerator for ice, etc.

When the patient is a child, it is desirable to have a nurse who is especially adapted to handling children. Nothing is more distressing than to have one in charge of a case who has to have a struggle in the carrying out of every therapeutic measure.

It is desirable to have the nurses stay on the premises, when off duty, as much as possible, and, as previously suggested, to have a room assigned to them connected with the treatment quarters.

One of the principal advantages of having the nurse off duty sleep on the premises is that it prevents their going out and coming in contact with other persons. They can take a necessary amount of outdoor exercise by making proper preparation before leaving their quarters and avoiding coming in contact with others when out of the sick room.

Not only should the meals for the patient be brought to the nurses, but the food for the nurses themselves.

Before leaving the treatment quarters they should, of course change clothes, thoroughly cleanse the hands and face and carry out other well known measures to lessen the chances of taking out the infection.

Where we have to rely on the members of the household for the care of the patient, some one or more individuals should be assigned to that particular duty and have no other domestic responsibilities. They should stay in the treatment quarters, just as has been suggested for the trained nurses, and in leaving the treatment quarters for needed outdoor exercise, they should conduct themselves just as previously suggested.

The physician, when entering the house, should leave his coat and handbag outside of the treatment quarters. He should then go to the bathroom and don a long gown, reaching from his chin almost to the floor. The sleeves may be long and fastened with a rubber band at the wrist or, if he uses a short-sleeved gown, his shirt sleeves should be rolled well up so as not to be exposed.

When treating a child's throat it is better to have the face covered below the eyes with sterile gauze moistened with bichloride solution and to cover the forehead and head with either a cap or gauze.

On leaving, he should thoroughly cleanse his hands, and his face also if the patient has coughed or sneezed during treatment.

If local treatment is to be employed, it is an additional precaution for the physician to wear glasses to prevent infected matter from getting in his eyes.

When the physician takes off the gown, it should be dipped in a bichloride solution (or some other disinfectant) and hung up to dry. After being hung up, it should not be touched by anyone until the physician next uses it himself.

The stethoscope and head mirror should either be left with the case or cleaned with alcohol after using. The nose and ear speculæ should be left with the case. Tongue depressors should be either of wood and burned, or of some material that can be boiled and left with the case.

Rest. Absolute rest in bed is a consideration of major importance. These patients should not be allowed to sit up for any purpose whatsoever. They should not be allowed to get excited when it can be avoided, and when the patient is a young child who resists examination, the greatest care should be used and diplomacy resorted to rather than violence. The physician can often accomplish more with bribes than he realizes.

It is rather hard to make a definite statement as to the duration of the rest in bed. The minimum should be at least ten days after the patient is clinically well and even a longer period is probably safer. These restrictions are often resented by the family and the physician should make the necessary effort to explain to those concerned the dangers and benefits involved.

When the patient is allowed to get up and return to activity, this should be very gradual and such violent exercise as skating, bicycle riding, and rowing should be deferred for several months.

Baths. There should be a cleansing bath every day. The use of hydrotherapy to reduce temperature is seldom necessary. The bath should be carried out with the greatest possible care. The water should be of a temperature thoroughly comfortable for the patient. Nothing more than the simplest sponge should ever be attempted.

In a case of laryngeal diphtheria, where the slightest effort on the part of the patient increases the dyspnoea, bathing is often best omitted for several days.

Bowels. Intestinal elimination should be maintained. Only mild laxatives should be employed; active purgation is inadvisable. When selecting a laxative, we can often consult the inclination of the patient and employ those that are least apt to be resisted. Milk of magnesia will often meet all requirements.

Diet.—As a rule the febrile stage of diphtheria is only a matter of two or three days and high caloric feeding is unnecessary during this period.

In the pharyngeal type of the disease there may be considerable difficulty in swallowing, and in the nasal type there may be sooner or later an involvement of the soft palate that will also interefere with taking food. During the febrile stage a diet may be used somewhat as follows:

Fruit juices, malted milk or other similar foods made up with water; buttermilk; broths or soups made with some cereal, strained and milk or cream added.

In making up these soups no condiments should be used and, if meat is used at all, it should only be enough to flavor, such, for example, as a little of the boney parts of a chicken. These are used in the first few days of the disease when the main consideration is to give something that is palatable to the patient and carries at least a certain amount of nutrition.

As soon as the fever stage has passed, the patient is put largely on a milk diet and to this is soon added such articles of food as, milk toast, well cooked cereals and butter.

Sherbet (particularly pineapple) is frequently very acceptable to the patient and in the pharyngeal type of the disease may give a certain amount of comfort. It may be allowed at any stage. Fresh pineapple juice seems to have some benefit in the pharyngeal cases.

When impairment of the soft palate develops, swallowing of liquids may be difficult and soft solids be better handled, such, for example, as milk toast, and well cooked cereals.

The patient can usually be well cared for by a diet of this type throughout the entire period of confinement and until the danger of nephritis has practically passed.

In the case of children, very often the feeding may be influenced by their diet in infancy. For example, if they have taken some prepared food that would not be contra-indicated in the disease, it may be given to them and will often solve the feeding problem entirely.

In the case of nursing infants, it is probably best to give the mother an immunizing dose and let the child continue to nurse.

If the mother of a nursing infant has the infection, it is usually best to give the child an immunizing dose and let it continue on the breast, at least after one or two days. The mother's breasts will have to be emptied and the child will empty them with very much less hardship on the mother than can be done artificially.

Specific Treatment.—There are but pitifully few specifics in medicine, but of these, the antidiphtheritic serum, is one of the most important, both from the standpoint of its percentage of effectiveness and the frequent necessity for its use.

It is highly probable that death from diphtheria would be practically unknown were it possible to administer the specific serum sufficiently early in all cases.

A physician's individual statistics will depend entirely upon the promptness of his diagnosis and his employing a sufficient amount of this material.

Dose. The amount administered depends upon several factors:—

First. The age and size of the patient.

Second. The duration of the disease before the serum is administered.

Third. The extent of the disease.

Fourth. The location of the membrane.

There seems to be practically no toxic effect from the antitoxin and the inconvenience that is sometimes occasioned by this treatment results from the reaction from the serum as such. Practically any dose within reason may be employed with safety, provided the patient is not sensitive to the serum itself.

In the present development in the preparation of this material, the concentrated products are put on the market and the chances for serum sickness have been markedly diminished. There is infinitely more damage resulting from too small a dose than has resulted from those too large. Cases have been reported that received as much as 300,000 units without any unfavorable effects.

Age and Size of the Patient. The weight of clinical evidence is in favor of not making too great a difference in the size of the dose in patients of different age and weight, particularly since the concentrated serum is employed.

In the case of very young infants, it is usually recommended to give a rather small dose. In young children it is best to make the minimum dose 5,000 units, in patients over ten years of age 10,000 units.

Duration of the Disease before the Serum Is Given. This is of much importance. The longer the disease has been in progress before the specific serum is used, the larger the dose required.

As a matter of practical fact it is rather hard to draw any definite, arbitary lines and only general principles can be stated.

By using a sufficiently large dose on all occasions, the chance of an error from the standpoint of giving too little is largely eliminated.

Extent of the Disease. This includes not only the extent to which the membrane has spread, but that to which the disease has made inroads on the general condition of the patient.

The one with an extensive membrane, that has evidently made rapid progress in its spread and showing evidence of marked toxemia, such as prostration, delirium and rapid pulse, should have the benefit of a large dose. 10,000 to 20,000 units will usually meet the requirements, and if it does not, the patient should have the benefit of a second dose within a period of eight to twelve hours.

Location of the Membrane. This is probably the most important consideration in varying the customary dosage.

In the pharyngeal type of the disease the doses as previously stated will apply.

In the nasal type, particularly if there are signs of toxemia, the average doses as previously stated may be doubled.

In the laryngeal type, there is a most urgent demand for prompt administration of a large dose; ten thousand units for a very small child and twenty thousand units for other patients should certainly be the minimum initial dosage. If the condition seems in any way urgent, at least 5,000 or 10,000 units should be given intravenously if possible.

Where to Inject. Among the various areas that have been suggested are the abdomen, the back, and the side or front of the chest. It is probable that less inconvenience is experienced if a large subcutaneous injection is made in the nipple line, about half way between the nipple and costal margin. This does not interfere with the patient's lying on his back and usually not even with the patient's lying on the side into which the injection has been made. There is less danger from the spread of an inflammatory reaction, due to the background of ribs and intracostal muscles. There is less danger in administering to a struggling child; the area is more easily treated for the relief of the local pain which sometimes is rather severe.

With the concentrated product, injection may be made into the arm at the insertion of the deltoid, just as in giving ordinary hypodermic injections.

How to Inject. Three methods are in common use—intravenous, intramuscular and subcutaneous.

The intramuscular injections are usually made into the gluteal region, the deltoid or the extensor muscles on the front of the thigh. It is claimed that absorption is more rapid than from the subcutaneous injections.

Subcutaneous injections probably meet the vast majority of requirements well. The absorption is fairly rapid, as can be judged from the disappearance of the skin elevation resulting from the injected material.

The intravenous injection should be used in cases where urgent action is indicated; for example, in the laryngeal type of the disease that is diagnosed late. It is needless to state that every precaution should be observed.

Except in certain types of hospital practice, the serum is always put up in syringe containers, so arranged that it can be easily connected for use without being contaminated. A small spot of tincture of iodine is put on the skin and the needle is plunged through this and the injection made slowly. This last suggestion should be particularly remembered as it lessens the discomfort. The needle is then withdrawn and the puncture wound touched with iodine. Some cover this with a piece of gauze, held in place with adhesive plaster. Many physicians make the mistake of applying a strip of adhesive directly against the puncture wound. This is apt to cause irritation, particularly if full strength iodine has been used. I believe it meets all requirements to merely touch the puncture wound with iodine. It should be left exposed for a moment to be sure that there is no leakage of serum.

When to Administer. Serum should be given as soon as the diagnosis is made. Where there is any doubt as to the diagnosis, the following general suggestions may apply:

In a pharyngeal infection, if the patient has been recently exposed to the disease and there is evidence of membrane formation, one dose of the serum should be given and then await a report from the culture.

Where there has been no history of exposure, if there is a membrane and the patient shows marked evidence of toxemia or if the membrane is in a solid piece instead of small patches or if the membrane is extensive and gives evidence of rapid spreading, it is better to give the first dose of serum and then await report of the culture.

In a nasal infection, if there is evidence of membrane, it is probably better to give the serum at once. A culture, of course, should be made.

If there is no membrane in view and there is a rusty colored excoriating discharge with a history of exposure, or without a history of exposure if the patient seems toxic, it is better to give the serum promptly.

In a laryngeal infection it is better always to give the patient the benefit of the doubt by giving the first dose of serum if the history and clinical evidence make it suspicious. If the condition does not clear up at once and continues to give evidence that contains a suspicion of diphtheria, the serum should be used just as through the diagnosis were positive, irrespective of laboratory reports. In the meantime, repeated cultures should be made.

If the patient has had a known exposure to diphtheria, it is particularly urgent that this plan be followed.

In all cases of children where a croup extends over into the following day, it should be regarded as diphtheria unless there is a definite history of previous experiences of this character in that particular individual.

With regard to repeating serum injections in any type of the disease, it is necessary to be guided by the clinical evidence. In the majority of cases, where the dosage has been employed as suggested in the preceding paragraphs, only one dose is required.

The physician should be conservative in evaluating the symptom of temperature, as it is not unusual for a rise in temperature to follow the injection of any serum.

When the membrane can be visualized, it forms the best index for repeating the dose. Improvement is indicated by the membrane ceasing to spread and lessening in area. Sometimes it takes on a darker color. While there may be a slight increase in temperature, there will usually be noted an improvement in the general condition of the patient.

In the laryngeal type, it is better to repeat the serum every six to twelve hours until improvement is evidenced by a clearing up of the evidences of toxemia and particularly by an improvement in the type of respiration.

Measures for Relief of Local Pain. There is usually a certain amount of discomfort at the site of the injection, and sometimes this is marked.

Some have suggested the application of hot fomentations. It has seemed to many that the best results are obtained by the use of an ice bag. The skin is protected by about two thicknesses of a common face towel and the ice bag applied over this. This pain usually lasts about six hours. It may be necessary to use codeine to secure a sufficient amount of relief to enable the patient to rest and sleep.

Anaphylaxis. This is a term that is frequently employed to designate the reaction of the individual to the serum. It should be borne in mind that this reaction is to the serum as such and not to the antitoxin that it contains. The word "anaphylaxis" refers to the sudden reaction that promptly follows the injection of the material. It is evidenced by dyspnoea and typical manifestations of shock.

Deaths have been reported, though as a rule the patient survives. Adrenalin is probably the agent of most benefit in combatting this condition. It is a safe precaution to have adrenalin ready when administering serum. While this condition is frequently mentioned in literature, in fact it is extremely rare.

Serum Sickness. As usually employed, this covers the later developments sometimes following the use of serum. It occurs usually from the fifth to the tenth day, probably averaging about the seventh. The principal manifestations are urticaria, sometimes considerable swelling, which may be general, but is most commonly evidenced in the face. There may be fever, nausea, and pain particularly around the joints which may show a reaction very closely simulating acute rheumatic fever.

Many measures of relief have been employed. The condition is largely self-limited. Hypodermics of adrenalin probably give as much relief as anything else yet suggested. Applications of sodium bicarbonate and water or soda baths sometimes seem of benefit. Sodium bicarbonate or other alkalies in large doses by mouth are used. Codeine may be necessary to secure comfort. The bromides may be tried.

It is wise to advise the patient and the family as to the possibility of serum sickness, else there may be a great deal of unnecessary alarm.

Precaution in the Use of Serum. The physician should always obtain a history as to whether or not the patient has previously had serum and whether or not the patient is subject to asthma, or if there is a family tendency to asthma. If there is a history of either of these conditions, it is better before administering the serum to test out the tolerance of the individual, unless the indications for its use are urgent. A safe rule is to inject about one-tenth of a drop and, if there is no reaction in the course of a half hour, to inject one drop; and if there is no reaction at the end of another half hour, the patient may be considered as nonsensitive and the serum used as in any other case. Some use only one test dose. Some prefer to test out the sensitiveness of the individual in this way in all instances.

Symptomatic Treatment.—In the majority of cases no symptomatic treatment is necessary. The patient is cared for along the lines of rest, diet, etc., as previously suggested, the specific treatment is employed, and the patient is clinically well in two or three days.

Pharyngeal Type. Many suggestions have been made as to gargles, sprays and applications. It is possible that many of these result in about as much harm as they do good. Particularly in the case of children, where local treatment requires a struggle, I think it decidedly inadvisable. One of my confreres, in treating a child with pharyngeal diphtheria, tried to paint the throat with a solution of silver nitrate. The child resented the treatment, so he had the attendant hold the little patient while he thoroughly carried out the local treatment. When the ordeal was over, the child was dead.

In older patients hot gargles or irrigations may give much relief. Among the solutions used are normal saline, potassium permanganate (1: 7500) and dichloramine.

The following prescription was extensively used with some apparent success long before the specific serum was developed:

(For an adult)

℞		or	
Potas. Chloratis,	ʒij	8	0
Tinct. Ferri Chlor.,	fʒiij	12	0
Acidi Sulphurosi, (H_2SO_3),	fʒiij	12	0
Glycerini,	f℥j	30	0
Aquae,	q.s. f℥vi	180	0

M.
Sig.—Tablespoonful in water every four hours.

A drink of water is given before the medicine and not after it. The medicine should be administered as strong as can be comfortably tolerated by the patient, usually one part of the medicine to about two or three parts of water. Nothing should be given afterwards for at least fifteen or twenty minutes. In the short length of time that this will be employed, there is practically no danger of damage to the teeth. It seems at least to give a certain amount of relief from the local discomfort.

Nasal Type. While little can be done here in the way of local treatment, it is sometimes possible to contribute to the relief of the patient. Various solutions are used by irrigation or spray. Among these are—normal saline, potassium permanganate (1:7500), dichloramine, boric acid, Dobell's and liquor antisepticus (N.F.).

In young children these may be dropped into the nose. A 10 to 20 per cent solution of argyrol or neosilvol is employed by dropping into the nose or applying with a swab.

Sometimes inhalations are used with apparent relief. These will be discussed in a succeeding paragraph.

Where pieces of the membrane can be easily reached, they may be carefully removed with forceps. This is particularly practical after serum has been used and the membrane begins to separate from the mucous surface. The presence of this material may cause considerable inconvenience by obstructing the nares, while it often can be easily removed, but care should be employed in carrying out this measure.

Laryngeal Type. In the laryngeal type of the disease, it is sometimes possible to augment the specific treatment by local measures.

Hot applications to the throat have seemed to give relief in some cases. Turpentine stupes have been commonly employed. In older patients, a bland oil spray may give a certain measure of relief. Care should be used to see that the atomizer throws a cloud of oil vapor and not large drops. The patient should breathe while the atomizer is being used.

Inhalations have been relied upon more than anything else. The following prescription will illustrate how they may be ordered:

℞

		or	
Mentholis,	ʒj	4	0
Camphoræ,	ʒj	4	0
Tinct. Benz. Co.,	q.s. f℥ij	60	0

M.

Sig.—Use a teaspoonful to a pitcher of hot water as an inhalation.

It is better to use this by putting a teaspoonful of the mixture in a rather large pitcher filled about two-thirds full of boiling hot water. The patient is brought to the side of the bed and the pitcher is placed near, but so arranged that the top of the pitcher will be lower than the patient's head. An inverted trough, made out of cardboard or several thicknesses of newspaper, is arranged so that it will cover both the top of the pitcher and the patient's head. This should be so adjusted that it will incline upward from the pitcher to the face of the patient. This has an advantage over a tent in that it does not lessen, but rather increases, the amount of fresh air. It causes a steady draft of fresh, warmed, moisture laden, medicated air to pass across the patient's face. The effect is sometimes markedly soothing. It may be repeated as often as desired.

Fever. This in diphtheria seldom requires special treatment. An ice bag to the head is as much as one often has occasion to employ.

Pain. The local measures previously suggested usually meet all the requirements. It is usually inadvisable to employ opiates and it is certainly inadvisable to resort to such agents as acetylsalicylic acid. If it should be necessary to use something for relief, codeine would probably be the agent of choice.

Nervousness. The tendency of the disease is rather to depression. One would seldom have occasion to employ any agent for nervous phenomena. Codeine would probably be the safest drug should anything be necessary.

Intubation and Tracheotomy. These are distinctly operations for a specialist. Where a specialist is not available, the general practitioner will, of course, have to meet the situation. These measures are seldom necessary.

Complications.—Where the diagnosis is made early and prompt and sufficient specific treatment employed, there are seldom any complications of more than a transient character.

Nephritis. Early in diphtheria there is often a transient albuminuria. True nephritis, if it develops, appears usually from about the third to the fifth week. It occurs principally in those cases where the true nature of the disease was not recognized and restrictions not observed. It is managed just as nephritis occurring from any other condition.

Paralysis. The paralysis most often encountered is that of the soft palate. It is evidenced by the regurgitation of fluids through the nose and by impairment of speech. It is usually a self-limited process and goes to a spontaneous recovery. There seems to be no treatment available.

There may be paralysis of other parts of the body. The treatment consists in the general care of the patient and the employment of such measures as massage. It is probable that the various agents that have been employed in massage, with apparent benefit, really were of limited or no value in themselves. Among these, alcohol has been more commonly used than anything else.

Heart Complications. The main treatment of these is prophylactic. Where the patient is handled with sufficient care, particularly from the standpoint of rest in bed, the chance of heart trouble is markedly diminished.

There may be acute endocarditis but by far the most common condition is myocardial impairment from the toxemia of the disease. The treatment is primarily rest and general care. There is no specific medication.

Adenitis. This usually spontaneously subsides when the local process is relieved. Relief may be afforded by the use of cold applications. Should pus develop, incision and drainage is indicated, just as would be the case in similar conditions arising from any other cause.

Pneumonia. This is most apt to develop in the laryngeal type of the disease. It should be treated just as would the condition developing from any other cause.

Other complications have been discussed in literature, but are extremely rare.

TONSILLITIS

Tonsillitis is any inflammatory process involving the tonsils. This group of diseases may very well be considered under five heads:

1. Acute Tonsillitis
2. Chronic Tonsillitis
3. Streptococcal Sore Throat
4. Vincent's Angina
5. Peritonsillar Abscess.

ACUTE TONSILLITIS

General Statement. Definition.—This is an acute infectious disease characterized principally by an inflammatory process involving the tonsils and often extending to adjacent structures. For convenience of study from the standpoint of treatment, the streptococcal sore throat and Vincent's angina will be considered under separate heads, and only the ordinary forms discussed here.

Incidence.—The disease is extremely common; practically all ages and conditions are affected. It is relatively rare in infancy and old age. It is most frequently found during childhood and early adult life, and becomes less common as old age approaches. The frequency with which the disease is found will be largely influenced by the care exercised in making routine examinations; this applies particularly to young children who are not able to make complaint as to the location of pain. Very often even with adults considerable involvement may be present without sufficient discomfort to cause the patient to mention the symptom if particular inquiry is not made.

The disease is of much importance not only from the amount of actual temporary discomfort entailed, but also on account of the many possibilities of trouble. These will be discussed particularly under the head of complications.

Etiology.—Acute tonsillitis may be transmitted by any means that cause an individual to come in contact with infected secretions from the mouth of a patient. It is highly probable that the condition is often conveyed by kissing, by the use of common drinking-cups and by improperly cleaned eating and drinking utensils. The disease may also develop through exposure to cold, or it might be said in a general way that certain forms of acute tonsillitis may result from the same general causes as acute colds. Under these circumstances we have to consider that those factors which tend to lower the resistance of the patient favor the development of organisms already present.

Of the various organisms which seem to be responsible for this disease the most common are the streptococcus, pneumococcus and staphylococcus.

Symptoms and Diagnosis.—As previously stated considerable involvement may be present with very little appreciable evidence. For purposes of discussion the symptoms may be roughly divided into two heads,—constitutional and local.

Constitutional Symptoms.—The onset is often sudden, though it may be a gradually developing process, the patient being conscious of increasing discomfort for several days.

Chilliness. There is very apt to be a sense of chilliness, or rigors, or even a definite chill; the last is rather uncommon, the rule being a more general discomfort of this character. Chilliness usually subsides as the condition more fully develops.

Fever. The temperature may be very high, often ranging from 103 to 104, and sometimes higher. The tendency is for the fever to persist for two or three days and gradually to subside. If the case is seen early and the proper measures instituted, the temperature may last only a few hours.

Pain. There are the usual discomforts of acute febrile conditions. As a rule the general aching is rather more than would be expected from the condition of the patient. There is usually considerable pain in the back, and aching particularly accentuated in the lower limbs. There is usually some headache, which at times may be severe. These pains subside when treatment is instituted and the local process improves.

Nausea. This is not a constant symptom, but is frequently met with. One of the factors that is probably responsible for this condition is the excessive secretion present in many of these cases; this is particularly troublesome because expectoration is painful. Actual vomiting is rare, except as a result of the local treatment.

Anorexia. As in the case of most acute febrile diseases, there is usually at first a disinclination to take food. This is here accentuated by the tendency to nausea and by the pain of swallowing. In many cases where there is no actual anorexia, swallowing may cause such discomfort as to prevent the patient from taking nourishment.

Cough. There is a consistent tendency to a certain amount of cough; this may be partly reflex and partly due to such factors as extension downward of the inflammatory process and the patient's inspiring more or less of the secretions from the throat. The cough is not usually characterized by paroxysms, but is of the so-called hacking type. Due to the discomfort of coughing there is a tendency on the part of the patient to suppress it.

Local Evidence.—When the throat is examined the tonsils are found to be redder than normal, and this discoloration usually involves also some of the surrounding structures, particularly the anterior pillars. In many cases the uvula and soft palate may show considerable redness and edema. The tonsils are more or less enlarged and may have deposits in the crypts. This deposit usually has the appearance of spots or lines of white, instead of solid patches, except in the case of streptococcal sore throat, which will be considered separately. The appearance also differs decidedly from that of diphtheria and Vincent's angina. This deposit can be removed without leaving a bleeding surface.

There is a marked increase in the secretions of the glands of the mouth and this secretion has a tendency to be thick and tenacious. In many cases there is a distinctly characteristic odor, and if the local involvement be extensive, there is a peculiar quality to the voice that is often spoken of as a throaty voice.

Laboratory Findings.—From the standpoint of differential diagnosis a culture is invaluable and should be made in all cases of sore throat. Acute tonsillitis causes an increase in the total white count and in the neutrophile percentage; at times these changes are very marked. There are often some albumin and casts in the urine, such as will be found in any acute febrile process.

Differential Diagnosis.—The most common conditions from which an ordinary acute tonsillitis will have to be differentiated are diphtheria, Vincent's angina, and streptococcal sore throat. A culture is of major importance in working out a correct diagnosis. In a general way it may be stated that the fever is usually higher than in diphtheria and the prostration less. There is less tendency in tonsillitis for the surrounding structures to be invaded. One of the principal diagnostic points is that if there is a deposit present in acute tonsillitis, it is in isolated patches or streaks and its location confined to the crypts of the tonsils; in diphtheria and streptococcal sore throat the membrane is one or more large solid areas, and has a tendency to invade the surrounding tissues. In these other conditions also the membrane when removed usually leaves a bleeding surface. The history of exposure is of much importance.

Prophylaxis.—As previously stated tonsillitis is an infectious process and every effort should be made to prevent its transmission to others. The patient should be isolated as far as is practicable. He should certainly use separate eating and drinking vessels, and these should be properly sterilized. Particularly in the case of children, there is a tendency on the part of parents to disregard the seriousness of this disease and to allow the child to continue to play and sleep with other members of the household. This, of course, should never be permitted. It is probable that one of the most frequent methods of transmitting the disease is by kissing. Persons should be educated as to the restrictions that should be placed on this method of demonstrating affection. Some of the particular measures with regard to prophylaxis will be discussed under the general management of the case.

Treatment.—While there is no specific treatment for this disease, it is one of those conditions in which much can be done for the relief of suffering, for shortening the course of the disease, and limiting complications.

General Care.—As previously stated the patient must be isolated as far as practicable, and it should be remembered that he may be infectious for many days after the acute symptoms have subsided.

Rest. This is often neglected. When we consider the extent to which there is a tendency to involvement of the kidneys, heart, and other body structures, we are impressed with the necessity for sufficient rest in bed. Where the patient has fever, this, of course, is doubly essential. It is desirable where possible to confine the patient to bed not only during the febrile period, but for a number of days afterward, depending to some extent on the course and severity of the disease. The room should be selected just as in the case of other infectious diseases from the standpoint of convenience in lighting, ventilating, and heating.

Bowels. Drastic purgation is not desirable, but sufficient intestinal elimination should be maintained. Large quantities of water either plain or in the form of various drinks not only help to maintain general elimination, but, if properly given, contribute to the comfort and well-being of the patient.

Frequent urinalyses should be made during the course of the disease, and at least two or three specimens should be examined following convalescence. The tendency to acute nephritis justifies every precaution in this particular.

Diet.—The disease is rather a short stormy infection and there is little need for a high caloric intake. The food given will have to be influenced not only by the temperature, but also by the ability of the patient to swallow. Until the local symptoms begin to subside, only liquids and possibly soft foods should be offered. Food that is very hot or very cold often seems of benefit. A diet may be given at first somewhat as follows: water, carbonated drinks, fruit juices, strained soups and broths, buttermilk, malted milk or similar preparations, tea or coffee. Cracked ice or sherbet are sometimes gratefully accepted. Pineapple juice seems to have some therapeutic value. As the temperature subsides, the patient may have such additions as plain ice cream, milk, gelatin, custards, etc.

Internal Medication.—In giving medicine we have several objects in view: to produce relief from pain, to modify the course of the disease, and to limit the possibility of complications. These results are all obtained by the use of salicylates. There is clinical evidence that salicylates have also some direct value in relieving the local processes, if they are given so that they come in contact with the area involved. We know the usefulness of salicylates in the treatment of rheumatic conditions should they develop, and it certainly seems logical to suppose that the incidence of such complications may be materially influenced by the early administration of this drug. Of the salicylates I prefer acetylsalicylic acid. In giving this I have obtained better results by giving it as a powder, to be held in the mouth until it gradually disappears, rather than in capsules or tablets. There is some tendency to gastric disturbance which seems to be modified by bismuth subnitrate; this latter drug may have some local effect also. The prescription may be written somewhat as follows:

(For an adult)

℞		or
Acidi Acetylsalicyl.,	gr. c	6|5
Bism. Subnitratis,	gr. ccc	20|0
M. ft. cht. no x		
Sig.—One every four hours till relieved.		

The patient should be instructed to drink a glass of water before the powder is given, and not for fifteen to thirty minutes afterward. There is no particular objection to the powder from the standpoint of taste, but if holding the powder in the mouth causes discomfort or nausea, it may be washed down with water, orangeade, or some other beverage. Among the advantages of acetysalicylic acid over sodium salicylate are its greater pain-relieving and fever reducing qualities, and a lesser tendency to cause gastric disturbances. When there is much pain, codeine may be prescribed in an amount sufficient for relief.

Another plan of treatment that has seemed to meet with rather marked success is one that has been used by several generations of doctors and in my personal experience has met the local requirements well. The prescription is somewhat as follows:

(For an adult)

℞		or
Potas. Chloratis,	ʒij	8|0
Tinct. Ferri Chloridi,	f ʒiij	12|0
Acidi Sulphurori, (H_2SO_3)	f ʒiij	12|0
Glycerini,	f ℥j	30|0
Aquae,	q.s. f ℥vi	180|0
M.		
Sig.—Tablespoonful in water every three hours.		

This should be given as highly concentrated as the patient can take it, usually about one tablespoonful of medicine to two or three of water, and the patient instructed to drink a glass of water before the medicine and not after it. The reasons for this are that the preliminary drink of water removes much of the secretions from the throat, allowing the medicine to have better local effect, and also that it dilutes the medicine in the stomach. Nothing is given after the medicine for fifteen to thirty minutes, so as not to interfere with its local action. This formula is one that was much used, particularly for the treatment of diphtheria, before the days of antitoxins.

Local Treatment.—This has been discussed in part in the preceding paragraphs, in the matter of hot and cold drinks, the use of salicylates, and the prescribing of potassium chlorate. In addition to these, many direct local measures seem to be of more or less benefit. Among these is the application of various substances to the diseased area by the use of an applicator. In the case of children, particularly, this measure may be employed with considerable difficulty; not only on account of the child's struggling, but because of the marked tendency to vomiting. Before making application to the throat, preparations should be made to take care of the patient should emesis result. Women are usually able to tolerate the treatment well; men make rather bad patients from this standpoint. Particularly in the case of adults, the greatest inconvenience is the patient's coughing in the physician's face; this is rather disagreeable and distinctly dangerous from the possibility of infection and proper measures should be taken for protection. To modify an expression of Billy Baxter's, we sometimes wonder whether we need more a plumber for the patient or a mackintosh and umbrella for ourselves. The process is materially facilitated by having the patient take short quick breaths and making the treatment as rapid as is consistent with good work.

Much depends upon the proper exposure of the tonsils. Where there is not much local inflammation and edema, the tonsils can be well exposed by having an assistant or the patient use the tongue depressor while the physician uses some suitable instrument which is placed against the anterior pillar and pressure made outward and backward. This usually has the effect of evulsing the tonsil, bringing it clearly into view and opening up the crypts, which may then be properly treated. Care should be taken not to have the mop contain too much of the medicine; otherwise, when it is applied, the medicine may trickle down and be inspired into the larynx, causing a paroxysm of coughing and sometimes much discomfort. The liability to this accident may be lessened by having the patient first take a forced inhalation and then making the local application while the breath is being slowly exhaled.

Among the applications of most value are tincture of iodine and solutions of silver nitrate, and of mercurochrome. The strength of these depends upon the frequency with which they are to be applied, and the condition of the diseased area. For general use the tincture of iodine is best diluted about one-half with the tincture of aconite. For a silver nitrate solution, a strength of about twenty percent is usually best. Mercurochrome is used in two percent solution. Smokers should be warned against the use of tobacco for some time after an application of silver nitrate. One application a day usually meets all requirements. When it is desirable to have local treatments made by the family or patient, the following safe prescription may be used:

℞		or
Tinct. Iodi,	f ʒij	8|0
Glyc. Acidi Tannici,	q.s. f ℥j	30|0
M.		
Sig.—Apply as directed.		

This may be used twice a day. One advantage of this treatment is that it is not severe in its local action and no damage can be done if it is extensively applied. Where the application is not made by some one trained in this line of work, it is a safe precaution to have it applied while the patient is making a long exhalation, as this lessens the chances of the medicine's being inspired into the larynx. Another application that is frequently used is the tincture of ferric chloride; this seems to have considerable value.

Gargles. The value of these is rather questionable as a general rule. Some patients, however, are able to use them so as to obtain considerable benefit. Many prefer a hot sodium chloride solution about twice the strength of normal saline. This may be made up by using a teaspoonful of the salt to a glass of hot water. It should be used frequently and freely. Another gargle that is frequently employed is a solution of hydrogen dioxide. This has a tendency to cause some irritation and should not be employed too often nor in too strong a solution. Probably the best results are obtained by using it once or twice a day and by having the official solution diluted with ten times its volume of water.

Hot and Cold Drinks. Sometimes a certain amount of relief is obtained by the use of very hot drinks or very cold drinks, particularly diluted fruit juices. Cracked ice or sherbet also may give a certain amount of comfort. These have been discussed in the preceding paragraphs.

External Applications. In many cases cold compresses or an ice bag properly applied to the neck may give considerable relief. Much depends upon the way the application is made. The common screw top ice bag is not as good for this purpose as a plain rubber sack, or some one of the special types of ice bags that are made for this particular purpose.

Surgery.—The present tendency is to regard the removal of the tonsils as so simple a matter as hardly to deserve serious consideration. As a matter of fact there is an element of danger, a great deal of discomfort and inconvenience, and it is at least possible that structures may be removed that have a definite function. During an acute attack, removal is, of course, out of the question. Repeated attacks may indicate an interval operation, particularly if there be any evidence of a chronic process or of complications. The age of the patient is a factor of much importance because in late adult life the operation is far from being as simple a matter as in childhood.

Complications.—There are many conditions that may result from acute tonsillitis; in fact, it is these mainly that give this disease its importance in human affairs. The probability of these complications necessitates the careful watching for them during the course of this disease.

The most common complications of acute tonsillitis are abscess, chronic tonsillitis, arthritis, endocarditis and chorea. The treatment of these will be discussed elsewhere.

CHRONIC TONSILLITIS

General Statement.—This disease is probably more frequent than the general practitioner suspects, and a thorough investigation of the tonsils should be an indispensable part of any general examination. Chronic tonsillitis is important largely on account of the possibility of other trouble, such as arthritis, endocarditis and pyelitis. In fact, a focus of chronic infection in the throat may materially interfere with the patient's well-being from many standpoints.

Diagnosis.—The discovery of this condition, as previously suggested, depends largely upon the character of the investigation. Those doctors who are always thorough in their routine examinations, find more cases than the careless. Among the symptoms which lead to a diagnosis are the tendency to arthritis, chorea, repeated peritonsillar abscess, etc. Secondary anemia or other evidences of an impaired state of being are sometimes present.

Fever. Usually this is very slight, and may not be noticed except by keeping a temperature chart covering several days. Of course a large percentage of these chronic cases do not show elevation of temperature.

Cough. This is not a constant symptom. There may be a short hacking cough that is more or less persistent or more definite and active attacks.

Frequent Colds. Very often the focus of infection in the tonsils is a factor in the predisposition of the patient to frequent attacks of acute respiratory infection.

Local Evidence. The cervical glands in relation to the tonsils may show more or less enlargement. Upon examination of the throat the tonsils may be found to be large irregular masses projecting toward the middle line, and often causing mechanical trouble by their presence. On the other hand it is not unusual to find the tonsils apparently perfectly normal, but, when pressure is properly made, pus can be squeezed out of the crypts. Sometimes there may be deposits in the form of hard cheesy masses. For making pressure on the tonsils I have been using successfully a dull uterine curette. The loop of this is bent so that a maximum of pressure can be exerted with a minimum of inconvenience to the patient; by moving the loop up and down, the gland can be thoroughly massaged.

In many of these cases of chronic tonsillitis there is some redness of the pillars of the fauces and sometimes considerable local secretion may be noted. There may be some odor to the breath.

Treatment.—It is an unquestionable fact that many of the cases return to normal without treatment; many others will be cured by patient and untiring medication. In certain types of cases, however, the palliative treatment is very discouraging, and surgery is the only satisfactory recourse. One of the main difficulties in making local applications is in getting the medicine down into the crypts. Sometimes this can be accomplished advantageously by having the patient or an assistant use the tongue depressor, while the physician holds in his left hand a dull curette, as mentioned above, or a stiff applicator with a smooth cotton mop on the end; and in the other hand he holds a stiff applicator with cotton mop, moistened with a solution of nitrate of silver or tincture of iodine or whatever medicine is to be applied. The loop of the curette or one of the mops is applied to the anterior pillar and pressure made outward and backward; this often has the effect of evulsing the tonsil, throwing the whole surface into view with the crypts widely opened. Where this can be successfully done, the chances of effecting a cure by local applications are excellent. This measure can be successfully carried out only in certain cases. Among the applications that have found most favor are solutions of silver nitrate in ten to twenty-five per cent strength or equal parts of tinctures of aconite and iodine or tincture of ferric chloride. Two per cent mercurochome is also employed. Many other agents have been extensively used. When it is desirable to have the applications more frequently made, the prescription may be ordered as shown on page 206 for acute tonsillitis. A member of the household is instructed to apply this twice a day.

The value of sprays is questionable; gargles are likewise of limited value. Among those most commonly employed are hot solutions of sodium chloride (about one teaspoonful to a glass of hot water), or the solution of hydrogen dioxide diluted with five to ten times its volume of water. Many patients prefer to use some of the proprietary mouth washes, and there is no objection to their employment.

I do not believe that internal medicine such as the syrup of ferrous iodide has any appreciable value, and it is probable that more damage is done to the teeth and stomach than good to the tonsils.

Where palliative treatment fails, surgery should be employed, if there are repeated attacks of acute tonsillitis; if there is interference with the speech, respiration or hearing; if there is a tendency to arthritis or other complication that might result from the tonsillar infection; or if there is persistent evidence of chronically diseased tonsils with or without complications.

STREPTOCOCCAL SORE THROAT

General Statement.—The diagnosis and treatment of this disease differs so little from that of acute tonsillitis, as previously discussed, that it will be covered only briefly here.

It is a stormy process usually characterized by high temperature and much local discomfort. The symptoms otherwise are largely those of the ordinary forms of acute tonsillitis. Upon examination of the throat a more or less extensive white membrane will be found; this has a marked tendency to spread to surrounding structures. It may extend along the roof of the mouth until it reaches the upper incisors. If the membrane is removed, a bleeding surface is left. There is practically no way to differentiate this condition from diphtheria except by cultures. It is a serious disease particularly if the larynx becomes involved. The treatment is the same as for other forms of acute tonsillitis. I have sometimes carefully removed the membrane and used various applications on the exposed surface. I have handled other cases without this measure, and it seems to me that the course of the disease is more favorable when there is non-interference. There is certainly much less local discomfort. If there be any doubt about the diagnosis, anti-diphtheritic serum should be employed immediately. Aside from the general measures previously discussed, the same prescription may be employed as recommended for acute tonsillitis page 204. This is given as strong as the patient can comfortably tolerate it, about one tablespoonful of medicine to one or two of water. A glass of drinking water is given before the dose and not after. The purpose of the preliminary drink, as mentioned previously, is to remove the secretions from the throat so that the medicine may make a better contact, and properly to dilute the medicine when it reaches the stomach.

VINCENT'S ANGINA

General Statement.—This is one of the forms of acute sore throat. Its discussion properly comes under the head of tonsillitis as the tonsils are most frequently involved. It is a moderately serious disease requiring careful handling. It is highly contagious, and every precaution suggested under the head of acute tonsillitis should be carried out.

Symptoms and Diagnosis.—The disease has a stormy course characterized by much discomfort and prostration. There is a tendency to rather high fever, although at times the temperature may be relatively low. There may be an initial chill, or simply a sense of chilliness There is a marked tendency to pain in the throat and often the taking of food is impossible. The general symptoms are very much the same as those discussed in the other form of tonsillitis.

On examination of the throat a grayish white membrane is found which usually has a tendency to spread to surrounding structures. There is often a distinctly disagreeable odor to the breath.

Laboratory.—A positive diagnosis depends on demonstrating the specific organism in the material taken from the area of involvement.

Treatment.—The local treatment is usually the same as that laid down under the head of streptococcal sore throat. Some recommend the careful removal of the membrane and the application of one of various medicines, such as tincture of iodine or a solution of silver nitrate. It has not seemed to me that this measure is often justified.

Neoarsphenamine is now being extensively employed. It is administered intravenously as for syphilis, and a solution is applied once or twice a day to the area involved. Bloodgood recommends borax as a mouth wash and gargle.

PERITONSILLAR ABSCESS (QUINSY)

General Statement.—This condition is fairly frequent and many cases show a marked tendency to recurrent attacks unless the tonsils are removed.

Symptoms and Diagnosis.—The fever, chills, pain, and other evidences of the disease are very much the same as described in the preceding paragraphs for acute tonsillitis, except that they may be more pronounced and persistent. There is an early tendency to impairment of voice, due to excessive secretions and swelling. There is difficulty in swallowing. Upon examination one side of the throat will be found to be swollen and encroaching upon the median line. Sometimes this grows to the extent of almost closing the passage. There is usually marked pain, sometimes becoming intense. There is almost always considerable swelling externally, very often producing the appearance of mumps, but it can be differentiated from the latter condition by the absence of the characteristic involvement in the region of the parotid gland.

Treatment.—The general care of the patient is the same as for other forms of severe sore throat. Local applications are practically without value. Codeine and acetylsalicylic acid may be used in an amount sufficient to relieve the discomfort. Sometimes hot gargles give some amount of relief. An ice bag or cold compresses applied externally are often of benefit. The proper treatment is incision, as soon as the evidence justifies this measure. The opening is best made with a sharp lancet protected with a strip of adhesive plaster about one-half inch from the point; this should be rolled around so as to form a small spool-like structure that will prevent the instrument from going too deep when the incision is made. After opening, if there is not sufficient drainage, the tips of Mayo scissors may be inserted and the blades separated. This opening of the incision with scissors may be necessary on later visits to keep the wound from closing, as continuous drainage is essential. Hot gargles favor maintenance of drainage.

VARICELLA (CHICKEN-POX)

General Statement. Definition.—Varicella is an acute infectious disease of unknown etiology, evidenced principally by a characteristic papulo-vesicular eruption and certain rather mild constitutional symptoms.

Incidence.—It is highly infectious and few escape it. All types and conditions of people are affected. It is fairly rare among young infants and adults. The comparative immunity of adults is probably due to the fact that most of them have previously had it, and those who have not represent a group of persons who are immune by nature.

Etiology.—The method of transmitting the disease has never been definitely established; the causative organism is unknown and the mild character of the malady has probably not stimulated the extensive investigation that has been devoted to more serious affections. It seems certain that varicella may be transmitted by an intermediate host or by infected material, as well as by direct contact. Woody has called attention to the almost uncanny spread of the disease in institutions, when, apparently, every effort has been made to isolate the infected.

Course and Prognosis.—The incubation period has been variously estimated at from ten to thirty days, with a probable average of about twenty. Many suggest that children who have not previously had the disease and have been exposed should be unrestricted for the first ten days after exposure, then isolated until it has been demonstrated whether or not they will develop the infection.

Varicella carries one of the lowest mortality rates of any infectious disease. Its importance lies chiefly in the inconvenience of isolation, especially for school children, and in the danger of a certain amount of permanent marking, which is more important in the case of girls. There is, of course, some discomfort during the process of the malady, enough, at least, to justify any reasonable effort at protecting children who might be susceptible.

Symptoms and Diagnosis.—In the course of an epidemic when all cases of sickness are suspected as possible varicella, there is not much confusion in making an early diagnosis. Under other conditions this is very often delayed, due to one or more of many causes. Among these may be mentioned the instances where the evidences are so slight that the disease is well developed, and many others exposed before a physician is called. Then again the skin lesions may be so few and may present such an atypical appearance due to scratching, that the diagnosis is difficult. The main advantage of early recognition is in preventing the spread of the disease and lessening the chances of scarring.

Constitutional Symptoms.—These may be so slight as to pass unnoticed, and the first evidence of disability that the family recognizes is the eruption. In a typical case there is a tendency to a pre eruptive period of malaise and general discomfort, during this time there is usually fever, though it seldom registers very high, rarely going over 100° to 101°. This is generally rather transient in character. Many have called attention to a tendency to nervous manifestations, this is probably not more than might be expected from the same amount of discomfort arising from any other cause. The main source of trouble is the eruption. This may cause enough inconvenience to interfere with sleep and rest generally. When the disease is recognized early and measures taken to relieve the discomfort of the local lesions, the nervous phenomena are negligible.

Eruption.—The local lesions are general in their distribution, though having a predilection to certain parts of the body. The face, chest, abdomen, and back are most affected. One of the diagnostic points of the eruption is the frequency with which the lesions may be found on the mucous membranes of the mouth and throat, and the infrequency of their appearance on the palms of the hands and the soles of the feet.

Character of Lesions. The lesion first appears as a discrete reddish papule which early shows a vesicle in the center. The vesicle is usually small, but may attain considerable size. The vesicle is, in most cases, soon opened by scratching or friction. It may become secondarily infected, giving rise to a lesion of large size with a tendency to persistence. It is probably this type that, occurring on the face, results in the pitting that is often noted. Scarring is particularly apt to take place on the forehead. The typical lesion disappears after a week or ten days without leaving any permanent evidence.

Differential Diagnosis.—The principal condition from which chicken-pox must be differentiated is smallpox. Among the most important of the many points of difference are: Varicella lacks the profound discomfort in its pre-eruptive stage. The progress is generally less stormy. Probably the most striking distinction from a diagnostic standpoint is the tendency for the lesions of smallpox to develop as one crop: that is, all the lesions, particularly in a given area, are found at practically the same stage of development; in chicken-pox, the lesions are found, in all stages of development. The lesions of smallpox favor the exposed parts of the body and the back, shoulders and arms. This is in contra-distinction to varicella. In variola the lesions have an infiltrated base and the vesicles are multilocular and indented. In varicella the vesicles are neither multilocular nor indented and the bases not infiltrated. There are some other diseases that might cause a certain amount of confusion, but they are hardly of sufficient importance to require discussion here.

Prophylaxis.—The disease is not of sufficient virulence to call for the strict measures that are observed in the effort to prevent the spread of some other infections, but it is certainly justifiable to use all reasonable effort to protect those who might be susceptible. It is particularly desirable to avoid exposure of children who are already impaired from any other cause. The management of the case from the standpoint of prophylaxis will be treated in the section on the general care of the patient.

Treatment.—The treatment of varicella resolves itself into the protection of others, contributing to the comfort of the patient, and preventing disfigurement.

General Care.—It is sometimes rather difficult to impress the family with the fact that the child is sufficiently ill to require any form of treatment, and in the vast majority of cases very little is needed. The physician will have to be guided by the condition of the patient and the likelihood of others being exposed to the infection.

Isolation. Where there are other members of the household who have not previously had the disease, the patient should be completely isolated as long as there is danger of infecting others. Where there are no other members of the household who might be susceptible, there is usually no necessity for limiting the patient to any particular quarters, unless such be indicated by his own condition. Under no circumstances should he be allowed to come in contact with outsiders throughout the entire period of probable infectiousness; he should at least be kept on his own premises. The possibility of transmission by infected material or by an intermediate carrier should always be borne in mind and the necessary precautions taken.

Rest. The necessity for rest in bed will depend upon the temperature and general discomfort. In the majority of cases confinement to bed is unnecessary; in any event, as soon as the fever and general discomfort have subsided, there is usually no reason why the patient should not be allowed to be up.

Room. In selecting treatment-quarters, the first consideration is that of isolation, should this be indicated in the particular household. Of course if confinement is necessary on account of fever and general discomfort, a room should be selected with a view to ventilation, heat, and accessibility just as in the case of any other sickness.

Nursing. Where possible, the nurse should be one who has previously had the infection. It is not often difficult to find one who has had the disease in childhood. These patients are seldom sick enough to require trained attention, unless it be dictated by the convenience of the family. In any event the one attending the patient should not come in contact with outsiders without taking sufficient precautions. The physician should also remember the possibility of his conveying the infection and take the necessary precautions while attending the patient. Such matters as the selection of a comfortable bed, attention to the mouth, and body cleanliness do not differ here from the management of any other mild sickness.

Diet.—Any one that is ill requires attention as to diet. In this disease during the febrile period the patient should be put on the usual fever diet. There is no necessity for a high caloric intake. Very often there are lesions in the mouth or throat that interfere with the comfortable handling of food and require material that can be swallowed without chewing. During the stage of fever a diet may be given somewhat as follows: water, diluted fruit juices, strained soups and broths, malted milk, etc. As the fever subsides, such articles as milk, gelatin, custard and soft cereals may be added.

General Medication.—This is seldom necessary. Mild intestinal elimination should be maintained, care being taken to avoid violent purgation. Where there is much fever or discomfort, acetylsalicylic acid may be used. It may be necessary at times to promote sleep and rest by the use of bromides or small doses of barbital.

Local Treatment.—Much can be done to lessen the discomfort of the local lesions and prevent mixed infection. Many plans of treatment have been suggested. The following ointment has met the requirement well—

℞		or	
Phenolis,	gr. v		3
Camphoræ,	gr. x		6
M. et adde			
Hydrarg. Chlor. Mitis.,	ʒss	2	0
Bism. Subnit.,	ʒiij	12	0
Ung. Aq. Rosæ,	q.s. ℥j	30	0
Sig.—Apply as directed.			

Every spot is touched with this ointment several times a day. The patient is, of course, given a daily cleansing bath and dried without friction, after which particular care is used in the treatment of each lesion. Those on the face should have the application every few hours. It is also particularly desirable to prevent damage by scratching. The nails should be kept trimmed as close as possible; not only should they be trimmed, but the cut margins should be polished smooth. The fingers should also be kept clean. Many have recommended bandaging the hands or splinting the elbows, but such measures are seldom necessary. The lesions in the mouth may be much relieved by touching them once a day with a ten per cent solution of silver nitrate.

Release of the Patient. The patient can be released as non-infectious as soon as the lesions have entirely healed. Sometimes on the body there are some that persist for several weeks. These are probably the result of mixed infection, and not of chicken-pox itself, and do not require the continued isolation of the patient.

VARIOLA (SMALLPOX)

General Statement. Definition.—Variola, or smallpox as it is more commonly called, is an acute infectious, specific disease that is characterized by certain more or less definite manifestations, particularly by a severe eruption which in a regular manner runs through the various stages of papules, vesicles, and pustules. The more common classification is into:

1. Variola hemorrhagica
2. Variola vera
3. Varioloid

Some sub-divisions of these are often made. The disease is also referred to as discreet or confluent, depending upon the character of the skin lesions.

Incidence.—There is no race or class of people which is immune. Epidemics are more common in the winter, possibly due to the close contact of individuals in that season. It is also more frequent among the ignorant classes, probably due to bad hygienic conditions, closer personal contacts, and particularly to the fact that vaccination and re-vaccination are not as thorough.

Etiology.—Much work has been done toward discovery of the causative organism, but we are still far from a uniformity of opinion in this matter. The disease is transmitted by direct contact or by contaminated material carried by an intermediate person. It is highly probable that it may also be transmitted by certain insects, particularly flies, through direct contamination.

Course and Prognosis.—The average incubation period is from ten to thirteen days, though this period may vary through a considerable range. The usual course of the disease is from three to six weeks. Mild cases may terminate in a much shorter time, or severe ones, particularly those with complications, may run a much more protracted course.

The prognosis is influenced by many factors, the most important of which is a previous successful vaccination. The age of the patient is also of significance, the disease being much more fatal among young children. The general condition of the patient and the facilities for proper treatment must also be taken into consideration. Another factor of prognostic import is the character of the disease, particularly the number of lesions and whether they are either hemorrhagic or confluent in type.

Symptoms and Diagnosis. History.—In establishing a diagnosis of variola, the history of direct exposure or the prevalence of an epidemic that might have entailed exposure are of particular interest. Another diagnostic factor that should never be overlooked is the presence of a successful vaccination scar, particularly if of sufficiently recent origin. Of course a history of the patient's having had smallpox would be of first importance in excluding the disease.

Onset. This usually takes place about ten to thirteen days after exposure. The incubation period is generally symptomless, though there may be malaise with some discomfort, particularly in the back. The onset is usually sudden, often with a chill followed by high fever, severe headache, and backache. There may be marked symptoms of toxemia, particularly in severe cases, the manifestations including such symptoms as stupor, restlessness, and delirium. In the milder cases all of these initial manifestations may be modified.

Pain. Headache is an almost constant symptom, it may be frontal or general. Backache is one of the most characteristic and constant manifestations. It usually persists throughout the first stage of the disease and is described as intense in character. There may be a tendency to contractions that simulate meningitis. With the appearance of the eruption, these symptoms usually subside. There may be some return during the second stage of fever, but of a milder character.

Fever. The course of the fever is also characteristic. It rises rapidly with the onset of the disease and in the severe type may reach 105 or over; it subsides with the appearance of the eruption, to return during the pustular stage.

Toxemia. This also usually subsides with the appearance of the eruption to return during the pustular stage, and may be manifested by such symptoms as restlessness, irritability, insomnia, stupor, or delirium. Insomnia is often complete during the first stage of the disease. There may be convulsions, particularly in children.

Pulse. There is nothing characteristic, the pulse usually corresponding to the temperature and respiration.

Gastro-intestinal Symptoms. Among these are coated tongue, fetid breath, nausea, vomiting and constipation or diarrhea.

Other Findings. There may be some tenderness of the liver region; there is usually enlargement of the spleen. The conjunctiva is injected.

Eruption. In the beginning of the disease there may be a somewhat scarlatiniform eruption on the lower abdomen and sides, but this is transient and occurs in only 10 to 15 per cent of cases.

The typical eruption appears about the third day of the disease, beginning with macules which rapidly change to papules. In the first stage of the eruption the lesions are hard, having a shotty feeling. They appear first on the forehead, the back of the hands, and front of the wrists, then on the face, neck, feet, and trunk. They also involve the mucous membrane of the mouth and throat.

About the second day of the eruption, the papules begin to assume a conical appearance and, during the next two or three days, the typical vesicles develop. They at first appear umbilicated due to a central depression, and are multilocular.

By the sixth or seventh day of the eruption the vesicles have become pustules and the umbilication has disappeared. This stage is usually well established by the seventh day of the eruption. At this time a redness has developed around the lesion, and, if they are closely located, there may be considerable edema of the area involved, and confluency may begin. During this pustular stage there is a secondary rise of temperature with a return of the toxic symptoms.

In the majority of moderate cases about the eighth or ninth day of the eruption the pustules begin to dry up, the symptoms subside and convalescence is established. Severe cases may run an indefinite course after this stage has been reached.

Desiccation. Desiccation usually begins about the 10th to 12th day of the eruption. During this stage there may appear bullæ, particularly on the lower limbs, these being followed by more or less ulceration. During desiccation there is usually more or less itching. There may be considerable loss of hair due to the lesions on the scalp, but the hair returns unless the hair follicles have been destroyed.

Laboratory.—There is nothing characteristic in the urine. The blood during the first stage shows a leukocytosis with relative increase in the neutrophiles. During the stage of intermission the white cell count is normal or below. During the second rise of temperature (pustular stage) there is an increase in the white cells, the lymphocytes usually predominating.

Differential Diagnosis.—As previously suggested, among the most important facts are a history of vaccination, or of the patient's having had the disease. A history of exposure is also valuable in building a diagnosis. It is hardly within the scope of this article to go into minute details as to the differentiation of variola from the numerous conditions with which it might possibly be confused. Probably the most common error is the confusion with chicken-pox. The main points of differentiation are the following: Variola is usually a much more severe process. The lesions develop in definite stages in contradistinction to the irregular progress of chicken-pox. While in variola the lesions in different parts of the body may show slightly different degrees of development the process follows, in an orderly way, the time of appearance—and all lesions in any one area correspond in development. In variola the lesions during the papular stage have a hard, shotty feeling to the touch, in the vesicular stage, they are umbilicated and multilocular. None of these characteristics are found in chickenpox.

Prophylaxis.—The first and most important factor is universal vaccination and revaccination. Nothing has been better established in medicine than the value of this measure. In the presence of an epidemic a general revaccination is always desirable and contacts especially should be promptly cared for in this way.

Among the other prophylactic measures are the reporting and isolating of the patient and the care on the part of doctor and nurse that would apply to the management of any infectious disease, except that in smallpox these rules should be more strictly enforced.

Where possible these cases should be treated in an isolation hospital and by those especially prepared for this particular work.

Treatment.—There is no specific treatment for the disease. The whole plan of management, therefore, resolves itself into protection of the community and the symptomatic management of the case, with particular attention to all those matters of general care that naturally apply in the case of one as ill as these patients usually become.

General Care.—As previously stated, it is better for these patients to be handled in an isolation hospital and cared for by physicians and nurses who are particularly trained in this class of work, and are not too intimately in contact with the outside world. In the larger cities such facilities are usually available. Where the patient is treated at home the first consideration is the selection of quarters that afford absolute isolation. The room should be one that is well ventilated and properly heated if the weather is cold. If possible there should be a bath and extra room for the use of those in attendance. The bed should be comfortable and one that lends itself to the convenient handling of the patient. Covering should be comfortable. If the physician or nurse has not previously had smallpox revaccination should be done at once. The nurse must be kept from contact with outside individuals. The physician should wear a gown, cap, and gloves when in the sick room. The patient's mouth should receive proper care at all times and when the eruption develops, special attention is required. The nails should be closely trimmed and the fingers kept clean.

Diet.—During the first stage of fever there is usually an almost complete anorexia, and at this time an effort should be made to give as much water as possible. The patient may have fruit juices or fruitades containing milk sugar, also tea, coffee, carbonated drinks, malted milk, and soups or broths (made with one-half milk and rice or barley, and strained). When the fever subsides, there is usually a period of two or three days during which considerable nourishment may be taken; at this time, in addition to the foods mentioned, there may be given milk, milk-shakes, buttermilk, gelatin, custard, well cooked cereals, butter, mashed potatoes, toast, and soft boiled eggs. With the return of fever (the pustular stage) the diet will depend upon the degree of severity of the symptoms. There is usually a period of several days during which nothing but liquids may be given; at this time there may be a return to the diet suggested for the first stage of the disease. As the symptoms subside, the diet may be carefully increased, the foods first added being those mentioned in the list to be used during the period of intermission.

There is often considerable dysphagia during the second stage of fever due to the eruption affecting the mucous membrane of the mouth and throat. At times it may be necessary to use some spray, as a weak Schleich's solution, just before food is taken.

Symptomatic Treatment.—Pain. The headache and backache are probably best relieved in the first stage of the disease by the use of codeine, or codeine and acetylsalicylic acid. During the second stage of the disease, depressing agents such as acetylsalicylic acid are best avoided. Pain is not usually so intense during this period of the disease and codeine will usually meet the requirements. Headache may be relieved by the ice bag.

Nervous Phenomena. The restlessness, insomnia, and other symptoms of this character may be relieved sufficiently by the rest, quiet, ice bag to the head, hot baths, and other general measures. Codeine is a valuable agent; also in the first stages of the disease acetylsalicylic acid may be of benefit. Bromides or small doses of barbital may be employed, if needed.

Fever. This may be sufficiently controlled during the first stages of the disease by an ice bag to the head and hydrotherapy. The acetylsalicylic acid that may be used for other symptoms also has a favorable influence. During the second stage of fever, reliance should be placed entirely upon the measures of general care, as antipyretic drugs are distinctly contra-indicated.

Eruption. For the mouth and throat bland mouth washes may be employed to advantage or relief may be obtained by touching the individual lesions with a solution of silver nitrate. The eyes may give considerable trouble, but cleansing with normal saline or a solution of boric acid, and applying the ointment of yellow mercuric oxide to the lids will usually meet the requirements. The skin eruption gives the most concern and many measures have been suggested, among which may be mentioned the following:

Touching the individual lesions with a full strength or half strength tincture of iodine.

The use of the continuous hot bath.

The application of a solution of potassium permanganate.

The use of diluted alcohol, or alcohol containing such agents as phenol or menthol.

During the stage of desiccation plain ointments are often of value. Such preparations may be used as Beck's bismuth paste or zinc oxide ointment, either plain or containing antipruritic agents as phenol, menthol, or camphor.

In the treatment of variola many special measures have been recommended, such as the use of phenol, salicylates, collargol, red light, etc. These may have a field of usefulness.

Complications.—Among the most common are bronchitis, pneumonia, abscesses, bed sores, and severe infections of the eyes. They should be treated very much as the same conditions arising from other causes.

EPIDEMIC MENINGITIS

General Statement. Definition.—This is an acute infectious disease resulting from infection of the membranes of the brain and spinal cord by the meningococcus.

It is not to be confused with meningitis resulting from the invasion of other organisms, as the pneumococcus or tubercle bacillus.

Various other names are used for this disease. There is a tendency now to adopt the term cerebrospinal fever. There are some objections that might be urged against this and it is probable that there is less confusion in the use of the name epidemic meningitis or epidemic cerebrospinal meningitis. It certainly seems advisable to drop from its nomenclature such names as spotted fever and petechial fever.

Incidence.—There is a marked tendency to epidemics though sporadic cases may develop from time to time without any explainable exposure.

It is particularly a disease of childhood, the majority of cases occurring in the first decade. In childhood males and females are affected to about an equal extent. In adults it is more common among males, probably due to increased exposure.

It is rather a disease of the city as compared to country communities.

There is a tendency to increased prevalence in late winter, spring, and early summer.

Etiology.—The causative organism is the meningococcus, sometimes called the Diplococcus Meningitidis of Weichselbaum. There are many factors relative to the manner of infection, the cause for apparent immunity and the mode of entry, that are not well understood; on the other hand within recent years much of the previous sources of doubt have been cleared up. The organism is supposed to enter usually through the nasopharynx. There are many theories as to the progress of this invasion, but it has been definitely established that in this infection the nasopharyngeal secretions contain the organisms, and it has been fairly well established that the transmission of the disease is through these secretions. It is probable that a contributing factor to the direct involvement is a breaking down of the resistance of these membranes. It is possible also that in many instances this is due to such factors as acute respiratory infections, and to the lowering of the body resistance as by exposure or exhaustion.

While the disease is certainly contagious, a fairly small percentage of contacts develop the infection. It is rare for more than one case to develop in a household, and doctors and nurses seldom are affected. It is also known that only a small percentage of those who actually carry the organism in the respiratory passages develop the disease. These individuals or carriers may transmit the disease to others without even being conscious of the fact that they are sources of infection. Carriers constitute one of the most troublesome factors in prophylaxis. The disease also seems to be more contagious at some times than at others, for example, at the height of an epidemic it is more apt to run a violent course and seems to be more readily transmitted than from the sporadic cases that develop when an epidemic is not in progress.

Course and Prognosis.—The actual progress of the disease is apt to be rather short and stormy. The protracted cases are usually the result of a failure to receive the proper treatment, or the development of complications. The mortality previous to the use of the specific serum was about seventy-five per cent; since the general employment of the present treatment, it has decreased to about twenty-five per cent. This phase of the subject will be discussed in detail under treatment.

Symptoms and Diagnosis.—During the course of an epidemic when both the laity and the profession are on the qui vive, the chances of an early diagnosis are good; on the other hand, the sporadic case is very likely to be overlooked in its early stages and, unfortunately, that is the time when specific treatment would be of so much greater value.

History. The point of particular importance here is the history of exposure, that is, whether or not there is an epidemic prevalent, or whether there has been any traceable exposure.

Onset. Usually the onset is abrupt. In some cases there may be a preceding period of malaise, but as a rule the condition is ushered in with some rather spectacular symptoms, as a chill in an adult, convulsions in a child, or sometimes violent headache, emesis and prostration.

Headache. This is one of the most characteristic and dependable of all the symptoms. The pain may be general over the head or localized as frontal or occipital. There is often associated with this considerable eye pain, as will be discussed later. This headache tends to be persistent, and to continue even into convalescence.

Pains in the Neck and Body. There may be the general body pains such as are felt in many acute febrile diseases. In meningitis there is a particular tendency to pain in the back of the neck running up into the occiput and downward along the spine.

Fever. The temperature is usually high, often reaching 104 or 105 within a few hours from the onset. There may be intermissions or remissions, but the tendency is to a more or less continuous elevation which gradually subsides as convalescence is established. There is nothing of particular diagnostic value in the temperature course.

Pulse. The pulse is usually rapid but may show many variations out of proportion to the temperature.

Respiration. There is usually an increased respiratory rate, often out of proportion to the temperature elevation. It is sometimes characterized by short shallow respirations with prolonged periods of intermission.

Retraction of the Neck. In addition to the pain that is often experienced in the back of the neck, there is usually a distinct rigidity and sooner or later retraction. This is not found in some cases that are treated early with specific serum.

Nervous Phenomena. Among the conditions very frequently present are restlessness, delirium, insomnia, hyperesthesia, stupor. Sometimes one or more of these may be extreme. Particularly in children there is often a marked tendency to convulsions; even the slightest disturbance, such as the slamming of a door or loud speaking precipitating a paroxysm. As the disease progresses, stupor and coma usually deepen.

Gastro-intestinal Disturbances. Among these are nausea, vomiting, anorexia, and constipation. The anorexia is not out of proportion to the degree of general discomfort. The vomiting is a fairly constant symptom. It may develop early and is often of a persistent character, assuming what is called a projective type, that is the matter is expelled with considerable violence. Nausea is often rather resistant to treatment.

Eye Symptoms. There may be pain, conjunctivitis, hypopyon, photophobia and abnormal pupils, such as unequal or dilated. Some of these may develop quite early or may be entirely absent.

Skin. There may be herpes very much as in pneumonia. In a fairly large percentage of cases there is a body eruption that is somewhat hemorrhagic in character, as evidenced by failure of the spots to disappear on pressure. In many cases this eruption is absent. This is one of the diseases in which the tache cerebrale is most often pronounced.

In infants the bulging fontanelle is one of the characteristic findings.

Emaciation. There is a marked tendency to a rapid loss of weight; this is more marked than in the ordinary, acute febrile diseases.

Joints. In some cases there is a polyarthritis that adds much to the discomfort of the patient.

Special Signs. Among the special signs that are of value in establishing a diagnosis are those of Kernig, Brudzinski and MacEwen. These are too well known to justify detailed description here.

Laboratory Findings. Blood. There is an increase in the total white and neutrophile counts. In addition to this the specific organism can often be isolated from the blood; sometimes this can be done before the development of symptoms evidencing the location of the infection in the meninges.

Urine. The urine shows nothing characteristic. There is the usual tendency to albumin and casts, such as is found in other acute febrile diseases.

Spinal Fluid. Examination of the spinal fluid constitutes the one certain diagnostic measure. It might not be amiss here to discuss some of the most important phases of this investigation.

Method of Obtaining the Specimen. Spinal puncture should be immediately done in all cases in which this disease is a reasonable possibility; this would apply particularly to those occurring during an epidemic and that show suspicious symptoms or that cannot be promptly placed under some other diagnosis. The value of an early diagnosis and treatment are of such importance as to justify us in giving the patient the benefit of the doubt. Where there is any uncertainty, it is unjustifiable to wait for the development of a whole train of classical symptoms, as it is often then too late to give the maximum of benefit from specific treatment.

Technic. The technic of this measure is so well known that only some phases of it need be emphasized here. The apparatus both for the spinal puncture and for administering the serum treatment, together with a sufficient amount of the specific serum should all be ready before the puncture is made. It is recommended that a needle be used instead of a trocar and cannula. The needle should be of medium small calibre and its length must depend on the size of the patient, usually from three to four inches. Suction should never be made by a syringe in removing the fluid, nor force exerted in introducing the serum, other than the moderate amount that results from the gravity method. It is better to have the patient in the lateral position and firmly held by an assistant. The patient should be turned toward the assistant, who may pass one arm around the neck and the other under the knees and gently but firmly flex the body as much as can be done without violence.

The matter of a local anesthetic must depend on the condition of the patient; where the individual is sufficiently conscious to be sensitive to pain, a novocaine anesthesia both superficial and deep is advisable. Much can sometimes be accomplished in securing the cooperation of a conscious patient, by suggestion.

The site of puncture should be cleansed and painted with iodine. The usual location is between the third and fourth, or the fourth and fifth lumbar vertebræ. The spine of the fourth lumbar vertebra is about on a level with the highest point of the iliac crest, and a string or tape carried from one crest to the other would cross this point. There is a considerable difference of opinion as to the relative advantage of introducing the needle into the median line or slightly to one side. In children the median line can always be used; in adults many prefer introducing the needle about three-fourths or an inch to one side and directing it inward and upward. The needle should not be pushed too far, but immediately stopped as soon as the sense of resistance is lost. If no fluid is obtained at first, the needle is slightly withdrawn or gently pushed forward. This should be done with extreme caution. Failure to secure spinal fluid is practically always the result of faulty technique. When fluid is not obtained by the original puncture, the needle may be withdrawn and introduced at another site. Various measures, such as irrigation with normal saline, have been suggested.

It is usually desirable to remove all the fluid that will flow freely through the needle; usually this varies from 10 to 50 cc. The operation should be promptly suspended in the presence of unfavorable symptoms such as marked changes in the pulse rate or rhythm, vertigo, cyanosis or emesis. Many have advised the use of a blood pressure apparatus and discontinuing the withdrawal of the fluid as soon as there is material change in the blood pressure.

Examination of Spinal Fluid. The fluid usually flows readily through the needle once it has been properly introduced. As a rule the spinal fluid in epidemic meningitis is cloudy or distinctly purulent. At times, particularly early in the disease, it may be perfectly normal in appearance. The one absolute diagnostic finding is the presence of the specific organism. In addition to this there may be such other evidences as pus, an increase in albumin, an increase in globulin, and an absence of sugar, as shown by the failure to reduce Fehling's solution.

Prophylaxis.—There is a tendency on the part of some physicians to regard rather lightly prophylactic measures, due to the fact that contact so seldom develops the infection. While this is true, the marked seriousness of the disease renders prophylactic measures doubly important.

Isolation will be discussed under the general care of the patient.

Another measure that has often been neglected is the investigation of contacts by making cultures from the secretions of the nasal passages and the pharynx. Where the specific organism is found, proper treatment should be instituted, not only for the benefit of the community, but also for the individual. While only a small percentage of those showing the organism develop the disease, still most of us would feel decidedly more comfortable if we knew that they were not present in our bodies.

The specific vaccine has been more or less extensively used, but its value is still rather uncertain.

Precautions to be carried out by the attendants on a case will be discussed elsewhere.

Treatment.—As previously stated, this is one of the diseases in which marked advances have been made in recent years; and in addition to this, many measures have developed for promoting comfort and giving symptomatic relief. There is now available specific treatment that has reduced the mortality from about seventy-five per cent to about twenty-five per cent, and it is probable that even this may be much lower in the near future.

General Care.—Meningitis is not as contagious as diphtheria or scarlet fever, but it is so much more serious when it does develop, that it is incumbent upon us to use all prophylactic measures with the greatest possible attention to detail. Cases should, of course, be immediately reported to the Board of Health and physicians should cooperate in seeing that restrictions are properly carried out.

Isolation. This should be absolute. The fact should also be borne in mind that the disease may be transmitted by an intermediate. Not only should the patient be isolated but, where possible, all contacts should be isolated also, until after their noninfectiousness has been demonstrated by the proper cultural procedures. The nurse should be prevented from contact with others more carefully here than in almost any other known disease. The physician should use all of the well known measures to prevent carrying the infection. These include such precautions as thorough bathing of the face and hands after attending the case, taking care that the patient does not cough or breathe in his face, and particularly avoiding such a contact as kissing anyone while he is attending a case of this disease.

Treatment Quarters. Particular care should be exercised in selecting a room that is free from noises. Where possible it is desirable to have a suite of rooms including a bath; one room should be used for the patient and one for the attendants when not on actual duty. The room should be selected with a view to proper lighting, ventilation and heating. In cold weather an open fireplace is highly desirable, as it lends itself to heating, ventilation and the disposal of infected material. The bed should be thoroughly comfortable and selected not only from the standpoint of the convenience of the nurse in handling the case, but with the fact in mind that the tendency of the disease is toward protracted confinement, marked emaciation, and the development of trophic lesions.

Nursing. It is, of course, necessary to have a night and a day nurse. Where possible it is advisable that sleeping quarters be assigned to the nurses and that they remain on the premises as far as possible, thereby lessening the outside contacts. When the nurses are on duty they should be careful to avoid contact with outsiders, and particularly with children. Nurses should be free from acute respiratory diseases or tonsillitis and they should take such precautions as can be reasonably carried out for their own protection.

Care of the Patient. Bathing, care of the mouth and other attention will depend largely upon the condition of the patient. Particular care should be given to the skin, to prevent the development of bed sores. An ice bag should be used to the head throughout the febrile period of the disease. The covering and clothing of the patient must be dictated by comfort, and by convenience in handling.

All infected material should be properly sterilized by boiling or be burned.

Diet.—It must be remembered from the beginning that a protracted period of sickness is almost certain, and that it is one in which there is a decided tendency to loss of weight. It is desirable, therefore, to keep the nutritional intake up to the digestive ability of the patient. During the early stages of the disease, feeding may be difficult, or almost impossible. At this time effort must be made to give a diet such as water, carbonated drinks, fruit juices (sweetened with milk sugar), tea or coffee (if the patient is accustomed to them, and these should contain cream and milk sugar), malted milk or similar preparations, cereal broths and buttermilk. As soon as the condition of the patient will justify it, the diet should be increased by the addition of such articles as well cooked cereals, toast, butter, etc. In infants very often the feeding problem may be solved by the use of some well tried food to which they have been accustomed and for which they have a relish.

Specific Treatment. Serum. There are few diseases for which specific treatment can be claimed. Due to the work of Flexner and his associates we now have available in a practical way a serum for the treatment of epidemic meningitis that has reduced the mortality from about 75 per cent to about 25 per cent. In addition to this, the duration of the disease has been shortened and the amount of damage to those recovering has been greatly lessened. It has been definitely established that where diagnosis can be made sufficiently early and the specific serum used that the present mortality of 25 per cent, can be more than cut in half. The earlier the treatment is instituted, the larger the percentage of recoveries, and the less are the chances of disabling sequelæ.

Indications for Use. In every suspicious case, before the spinal puncture is made for diagnostic purposes, the serum should be obtained and the apparatus for administering it prepared and tested, so that if sufficient indications are found, the treatment can be administered immediately. If there are sufficient clinical evidences of meningitis, particularly in the presence of an epidemic, it is generally conceded that the serum should be injected irrespective of the appearance of the spinal fluid. Even without fairly definite clinical evidence, the serum should be administered if the spinal fluid is turbid or purulent. Subsequent administrations will be governed by the result of the examination of the fluid withdrawn, and by the other clinical data. The possibilities of harm, if it is unnecessarily used, are very small as compared with the advantages of its early employment if the disease is present.

Dose. The size of the dose is indicated principally by the amount of spinal fluid withdrawn and by the reaction of the patient during the administration of the serum. The average adult dose by spinal administration is about 30 cc. (one fluidounce). It is usually advisable to introduce just a little less serum than the amount of the fluid withdrawn. It is evident, therefore, that at times it will be possible to introduce considerably more than the thirty cc., while at other times it may be inadvisable to arbitrarily use this much.

If, during the administration, the patient should show such symptoms as rapid or intermittent pulse, much change in blood pressure, cyanosis, headache or vomiting, the administration should be discontinued, and if the symptoms are sufficiently serious, some of the serum withdrawn.

In regard to the number and frequency of doses, we have to be guided largely by the condition of the patient. The concensus of opinion at present is that there should be at least four doses. The usual custom under average conditions is to give one dose every day for about four days; in a fairly large percentage of cases this meets the requirements of spinal medication. In some cases the indications are for further continuing the daily treatments; in other cases it is advisable to give at least a day or two of rest and watch results, the treatment then being resumed for another series, if indicated, or it may be found that sufficient serum has been used.

It is sometimes advisable during these intervals to continue the spinal punctures, merely removing a sufficient amount of the fluid to give necessary relief from clinical symptoms. This is also apparently a therapeutic measure that has a definite curative value. Many cases have been reported in which a dozen or more serum administrations have been used with benefit. The fundamental principle that makes for successful treatment in this, as in most other phases of treatment, is not to try to arbitrarily follow a definite rule, but to individualize each case and be guided by a consideration of all the available clinical evidence.

Intravenous Administration of Serum. As the disease under discussion is a general infection with the organism in a large percentage of cases recoverable from the blood, it seems reasonable that the intravenous use of the serum is definitely indicated; this is well borne out by clinical evidence. Some have gone so far as to advise the intravenous administration in all suspicious cases, and the withholding of spinal administration until the organisms have been demonstrated in the spinal fluid. As spinal puncture for diagnostic purposes is immediately indicated in all suspicious cases, and the spinal administration of the serum adds so little to the discomfort or danger of the procedure, it seems best that all suspicious cases should immediately have the benefit of spinal administration, but, in addition to this, the prompt use of serum intravenously. The usual dose by vein is from 60 to 120 cc. (2 to 4 fluidounces). It may be repeated under the same conditions as would call for its continued use by spinal puncture.

Duration of Serum Treatment. This should be continued until the clinical evidence is such as to justify the conclusion that all organisms in the body have been destroyed. The principal criterion is the result of examination of the spinal fluid. Probable cure is indicated by the disappearance of the organisms and pus, the reduction of Fehling's solution and in the lessening of pressure. In addition to these laboratory findings we must be guided, to a certain extent, by the temperature and the subsidence of other symptoms.

Precautions in Using Serum. One of the first considerations is the avoidance of an anaphylactic reaction. A history of the patient having had asthma or of the recent administration of any serum certainly calls for a testing out of the individual's susceptibility to serum and the employment of desensitizing measures, if indicated. In fact it is a wise precaution to apply this to all cases.

The administration of serum should be carried out with every precaution as to asepsis, and, whether by vein or spine, the material should be introduced slowly.

Spinal administration should always be by the gravity method, with the receptacle only about ten or twelve inches above the needle. After the serum has been introduced, it is best to leave the needle in position for a few minutes so that some of the fluid can be withdrawn in case unfavorable symptoms should develop.

Many have recommended raising the foot of the bed about twelve inches following the spinal administration, so as to obtain the benefit of gravity, as the serum introduced is heavier than the spinal fluid.

It has also been recommended that before the removal of the spinal fluid, the head of the bed be raised for two or three hours so that the pus or other heavy material may gravitate down and be removed more completely in the withdrawn material.

Symptomatic Treatment.—While the effort is being made to cure by the use of specific serum, one must not lose sight of the fact that the patient often presents many symptoms that can to a greater or lesser extent be relieved.

Pain. Much can be done for this in the general care of the patient, as rest, quiet, proper elimination and an ice bag to the head. In addition it is usually necessary to resort to medication Codeine is probably the most valuable agent and may be employed by needle or by mouth, in such amount as is required. At times morphine must be used. During the stormy period of the disease, acetylsalicylic acid with the codeine may be of advantage but should be used with caution.

Nervous Phenomena. The marked tendency to restlessness, insomnia, and convulsions, may often be relieved by the same measures as suggested for pain.

Sometimes barbital in 5 grain (0.3 Gm.) doses (for an adult) may materially aid the other measures that are being employed.

The bromides are too mild to meet the requirements in many of these cases, but are often employed to advantage for lesser manifestations, or as an aid to more active medication.

Vomiting. This is of central origin and local measures seem to have very little benefit. In addition to the rest, quiet and use of the ice bag, it is probable that the bromides are the most satisfactory agents. The nausea can be modified to a certain extent by care as to food intake, as it is only reasonable to suppose that where a tendency to nausea exists, undigested food in the stomach might be the deciding factor in precipitating emesis.

Constipation. This is a fairly common condition and must be combatted by the use of mild laxatives and enemas. The routine administration of liquid petrolatum or olive oil usually meets the requirements entirely or lessens the necessity for more active purgation.

Retention of Urine. This should be carefully watched for and a catheter used if indicated.

Emaciation. This has been discussed under the head of diet.

Vaccine.—In addition to the employment of vaccines in prophylaxis, there is a tendency to use them in the latter part of the treatment of the disease in the hope of lessening the number of relapses that result from foci of infection that have not been reached and disposed of by the body fluids during the period of passive immunity resulting from the serum injected. This matter has not been sufficiently worked out for a positive statement to be made, but is certainly worthy of further consideration.

Convalescence.—In a large percentage of cases under the present system of treatment the recovery is so prompt that convalescence presents few problems. In many instances, however, there is such exhaustion, emaciation, and nervous unbalance that great care is necessary to restore the individual to normal.

The physician should certainly guard against the usual tendency to a rapid return to activity.

A highly nutritious diet, proper periods of rest, modified recreation, and careful avoidance of any unfavorable influence should be arbitrarily secured.

Complications.—Among the most frequent are brain abscess, internal hydrocephalus, paralysis, otitis, arthritis and mental impairment. Of these brain abscess and internal hydrocephalus are essentially surgical conditions. Paralysis would be treated as such arising from other causes. Ear involvement should call for the advice of a specialist, and be managed very much as the same condition occurring from some other disease.

Arthritis is managed as the same condition occurring from other causes, except that it has been advised by many to remove the fluid, if any accumulates, and inject the specific serum. The majority of the cases of arthritis are transient and mild and only call for the use of palliative measures.

MUMPS (EPIDEMIC PAROTITIS)

General Statement. Definition.—Mumps is an acute infectious disease of unknown etiology, and characterized especially by a transient involvement of one or both parotid glands.

Incidence.—All races and conditions of people are affected, apparently with about equal frequency. Infants and old people seldom have the disease; the latter probable due to the fact that it is so common that all those who are not naturally immune acquire the infection early in life. The vast majority of cases occur between the fifth and twentieth years of life. Sometimes an epidemic assumes considerable local proportions and the work in schools may be very much disorganized.

Etiology.—The specific organism in unknown. The infection seems to be transmitted through the secretions of the mouth; therefore the disease can be contracted in any way that would cause a susceptible individual to come in contact with such material. It is probably very rare for an intermediate person to transmit the disease.

Course and Prognosis.—The consensus of opinion places the incubation period at from one to three weeks, probably averaging about two. Some claim from one to four weeks and the average as nearer three.

One attack renders the individual immune for life. There is a popular belief that a person who has had the disease on one side may later contract it on the other. It would seem if this can be established that there is some peculiar change taking place in the glands. Medical opinion is that immunity in this, as in other diseases, is worked out through the blood, and, therefore, one attack would confer immunity, even though the individual had only one gland involved. The course of an average case is about one week, but complications may indefinitely prolong this period.

Symptoms and Diagnosis.—As the condition is infectious in its early stages, it is highly desirable to make a prompt diagnosis, and in the majority of cases this is easily established. There should certainly be little doubt in the course of an epidemic or where the patient gives a history of known exposure.

The disease usually manifests itself as a swelling and tenderness of the parotid gland on one or both sides. This swelling is generally in evidence both in front and back of the lobe of the ear and pushes out that structure. The swelling may be slight, while at other times it is marked and the entire front and sides of the neck and even the upper part of the chest may be involved in the process.

It is not unusual to note a markedly rapid increase in the size of the swelling as a result of chewing or taking acids.

Other glands may be primarily or secondarily affected, though such is decidedly unusual, except the testes as a secondary involvement.

Fever. This is often the first symptom noticed, although there may be a preceding period of malaise and sometimes of considerable discomfort. The temperature seldom goes high, though at times it may reach 103 or 104. Some cases show practically no febrile reaction.

Pain. In addition to the general discomfort such as might be expected with any febrile disease, there is usually more or less local pain, in the region involved. This pain is usually increased particularly by the act of chewing or at times even from an effort to open the mouth. Chewing probably increases the pain for two reasons, one because of the motion and the other by a stimulation of the gland secretion. The pain is often markedly increased by taking acids into the mouth, and one of the means of diagnosis frequently employed by the laity is to give a suspected person a pickle to eat. This, of course, is not an absolute test, as frequently there is no appreciable discomfort occasioned due to the duct of Steno being open and the secretions finding an unobstructed outlet, thus preventing local swelling.

There are epidemic peculiarities in this disease as in many others; some epidemics being much more severe in their general manifestations and some more prone to complications.

Differential Diagnosis.—As the parotid gland is the one primarily involved the differential diagnosis is limited to a very few conditions.

Among these are pyogenic infections and tumor of the parotid.

These are rare and do not occur in epidemics, and in case of tumor would be slow in developing. In the pyogenic infections there are other evidences, such as blood changes that will establish a diagnosis.

Enlargement of the glands related to the tonsils may sometimes cause confusion. The lower situation of these glands is the main feature in a differential diagnosis; that is, the swelling is below the ear and does not partly surround the lobe, nor tend to push it out. There is usually a history of involvement of the tonsils, or evidences of such still present. The differential diagnosis of orchitis will be discussed under the head of complications.

Prophylaxis.—Every care should be exercised to protect persons who have passed the age of puberty, as the disease among these is not only totally disabling and entails considerable suffering, but the complications, particularly in males, place the disease among those that should be regarded as distinctly serious in character. Not only may the individual be subjected to much suffering and incapacitated for months, but permanent damage, such as atrophy of the testicle, frequently results. At the risk of being accused of rank heresy, I will say that it is my opinion that male children, without exception, should be exposed to mumps. It is the only known disease where such a measure should even be considered. I have never known a child to suffer more than a few days of mild inconvenience, while I have observed men impaired for life.

In all cases a patient with this disease should be isolated from contact with all others who have not previously had the infection, except in those instances where it is desired to expose male children. As much effort should be made to protect others as would be carried out in a case of scarlet fever. The patient should be confined to a room, put in charge of an attendant who has had the disease, and all infectious material properly disposed of. Separate eating and drinking vessels should be used and both nurse and physician should take the usual precautions upon leaving the sick room. Children who have not previously had the disease and have been exposed should not be allowed to come in contact with others any more than is absolutely necessary. The usual duration of this restriction is about twenty days, as they may infect others before giving any manifestations of the infection in themselves.

Treatment.—There is no specific and efforts are directed along the lines of contributing to the comfort of the individual, limiting the chances of complications, and protecting others.

General Care.—As previously suggested the patient should be isolated, placed in care of a nurse who has previously had the disease, and strictly confined to bed during the febrile period. If the patient is a male who has passed the age of puberty, he should be kept in bed for several days after the symptoms have subsided, so as to lessen the tendency to orchitis. In selecting the treatment quarters, unusual care should be exercised to choose a room where isolation can be carried out, if there are any members of the household who may be susceptible. The arrangements as to rest, quiet, ventilation, heating, a comfortable bed, and proper clothing and covering are managed just as in the case of any other type of sickness of equal severity. There is no reason why every effort should not be made to keep these patients as comfortable as possible.

Diet.—The food should be such as can be swallowed without chewing and be entirely free from acids. The reason is that both chewing and the intake of acids stimulate the secretion of the parotid glands which, should the outlets be obstructed will collect in the gland, causing a rapid increase in the swelling and consequent discomfort. The diet may be arranged somewhat as follows: Water, simple strained soups and broths (made with some cereal and one-half milk or one-fourth cream), and malted milk or similar preparations. As the fever subsides or if there is not much fever, milk may be given freely, and such other foods as gelatin with cream, Spanish cream, and cereal gruels with cream. These meet the temporary requirements and seldom cause discomfort. The diet may be increased rapidly as the symptoms of the disease subside.

Local Applications.—Many local applications have been suggested, but in the vast majority of cases the patient does just as well or better if no effort at local treatment is made. Among the measures that are indicated at times are an ice bag or cold compresses, or hot applications such as turpentine stupes, a hot water bottle, or an electric pad. A frequently used application is lead water and laudanum; it is applied by moistening cloths with the solution ice cold, applying to the swollen area and changing as indicated. Many ointments have been suggested.

Mouth Washes. It is advisable to use only sufficient measures to keep the mouth comfortably clean. Where the mouth can be opened well the teeth may be cleaned with gauze wrapped around the index finger and dipped in some mild alkaline wash, such as Alkaline Antiseptic Solution (N. F.). It is certainly better to avoid acid mouth washes.

Internal Medication.—There is no specific and medication is confined to that which is necessary to give sufficient relief. Codeine may be used when there is enough discomfort to justify it. If there is much pain and particularly if much fever, acetylsalicylic acid will usually give the necessary relief; this may be used alone or with codeine and administered in capsules if possible.

Complications. Orchitis.—This is by far the most common complication and one that occurs in from 15 to 30 per cent of the cases in males who have reached the age of puberty. It is of extreme importance, not only from the standpoint of discomfort and disability, but for the reason that due to damage to the glands permanent impairment may result. This is particularly unfortunate where both glands are involved, as impotency must naturally follow. It is this complication that lends the element of seriousness to mumps as a disease.

In the way of prophylaxis against this condition there is considerable doubt as to the value of any measures that have been suggested. I have made it an inviolable rule to confine all adult males to bed throughout the febrile period and in fact for several days after all symptoms have subsided; yet case after case has gone on to this unfortunate complication. There is sufficient possibility of rest in bed being of value to justify us in always insisting on its being rigidly enforced.

Differential Diagnosis of the Orchitis of Mumps.—The main condition that is apt to cause confusion in the diagnosis of this condition is the orchitis of gonorrhea. In mumps there is usually a history of a preceding involvement of the parotids, and in gonorrhea a history of a preceding urethritis and almost always still evidence of that condition.

Treatment of the Orchitis of Mumps. General Care.—Rest in bed is absolutely necessary. Not only should the patient be confined to bed, but made as comfortable as possible, as he is usually in for a rather prolonged siege of illness that is characterized by much discomfort. The selection of the room; the type of bed, clothing, covering, etc. require the same attention as for any other case of serious sickness. Good nursing is indispensable. Rest in bed should be maintained until the condition has completely subsided, as it is not unusual to see relapses when the effort is made to resume activity too early.

Mechanical Support. Various devices have been suggested. There is a special suspensory made for this purpose that seems to meet the requirements well. The disadvantage of adhesive strips is that they interfere with movement and in that way with rest and comfort. When an effort is made to give the proper support by placing towels under the swollen glands, these are usually disarranged in sleep and the patient is awakened by pain. A suspensory should be sufficiently large to admit of any necessary dressing being used next to the skin.

Local Applications. Among those that have seemed to be of value are the following: Hot or cold applications; these may be applied in the form of compresses or the ice bag may be used. There has been some objection made to the use of hot applications on the ground that they may tend to promote suppuration. The lotion of lead water and laudanum has been used for generations; it is generally employed in the form of cold compresses. The following ointment has seemed to contribute to comfort in some cases:

℞		or	
Camphoræ,	ʒss	2	0
Ichthyolis,	ʒij	8	0
Ung. Belladon	ʒij	8	0
Petrolati,	q.s. ℥j	30	0
M.			
Sig.—Apply twice daily.			

This should be applied freely to the scrotum, covered with cotton and a comfortably fitting suspensory put on. Or the patient may use the cold compress during the day and employ this dressing at night, as its use would not entail the inconvenience necessary in carrying out the compress treatment.

The following application is extensively employed:

℞		or	
Guaiacolis,	fʒj	4	0
Ol. Olivæ,	q.s. f℥j	30	0
M.			
Sig.—Apply as directed.			

Internal Medication. Usually some medication has to be used to relieve discomfort. Codeine and acetylsalcylic acid probably answer better than anything else; they are not given in a routine way but only as needed for relief.

Convalescence.—Where the complication has run a severe or prolonged course, the patient may be anemic and generally exhausted The usual dietary and recuperative measures should certainly not be neglected in the effort to bring the individual back to normal as early as possible.

The patient or family should be advised at the beginning of the possibility of atrophy of the gland involved, and should certainly be given the benefit of further information as to the limited extent of the disability if only one is affected. It can be explained that nature in equipping the individual has usually gone beyond what was necessary to meet requirements, and should one gland be lost he can still meet every requirement of life, just as though he had never been affected.

Other Complications. Various other glands of the body may be involved, such as the sublingual, submaxillary, thyroid, pancreas, breasts and ovaries. These are so rare as hardly to merit discussion. The impression prevails with many that the ovaries in women are involved with considerable frequency. In my own experience I have never treated a case of mumps in which I was able to establish the presence of such a complication. Should other glands be involved, they should be treated symptomatically along the same lines as set forth in the preceding paragraphs. Should suppuration occur, surgical measures should be promptly instituted. Fortunately, however, suppuration is rare in this disease.

ERYSIPELAS

General Statement. Definition.—Erysipelas is an acute infectious disease resulting from an invasion of the tissues by the streptococcus erysipelatis, and characterized by certain local evidences and constitutional symptoms of more or less severity.

Some subdivisions are recognized based on location or character; for example, the facial, phlegmonous, recurrent, etc. The majority of cases are about the face, next in point of frequency, the legs.

Incidence.—No one is immune. It is more common among males, probably due to their more frequent exposure to infection and conditions favoring its development. The incidence is highest in adult life. It is much less common now than in the past, due to the greater attention that is given to wounds and the general application of aseptic and antiseptic methods both in medical practice and by the laity.

Etiology.—The causative organism is the streptococcus erysipelatis. This usually gains entrance through some lesion of the skin or mucous membrane. The actual implantation of infection, in the majority of cases, cannot be traced. The disease can be carried by an intermediary, or acquired by coming in contact with infected material. Contributing factors include all conditions tending to traumatism, such as male sex, active adult life, and hazardous vocations.

Course and Prognosis.—The usual incubation period is from two to fifteen days. There is considerable difference of opinion among observers but, in all probability, the majority of cases develop between two and seven days after infection.

The disease usually runs a short and stormy course, followed by a fairly rapid convalescence. The fever lasts an average of about seven days. It may terminate by lysis or by more or less of a crisis; the location of the process influences the duration and severity to a considerable extent. When the infection begins in the mouth, nose, uterus, or other more or less inaccessible location, it is much more apt to be severe. Recurrent attacks have a marked tendency to be more benign in character.

Under the present plan of treatment the average mortality is probably between five and ten per cent, depending upon the location of the disease and the character of involvement. Erysipelas beginning in the mouth carries a very high death rate. The prognosis in a recurrent attack developing on the skin is very good. Where the deeper structures are invaded, as in the phlegmonous type, the mortality is high, and the tendency to permanent disfigurement is much greater.

Symptoms and Diagnosis.—When the disease attacks the skin, which it does in the vast majority of cases, there is seldom much confusion in establishing a diagnosis. An early diagnosis is of importance for prophylaxis, treatment, and prognosis.

Local Manifestations.—The local cutaneous lesion is usually distinctly characteristic. It occurs as a reddish area with irregular elevated margins, somewhat wavy in character. The line of demarkation between the diseased and the healthy skin is usually sharply drawn. The lesion shows a tendency to spread from the periphery, and at the same time to clear up in the center. This area may remain a dusky reddish color until it begins to fade in healing, or there may be vesicles or bullae. There is usually considerable involvement of related glands and much local edema. In erysipelas of the face there is usually considerable swelling, particularly around the eyes, which are sometimes entirely closed. When the disease is in the mouth, the edema may produce disastrous results. As the process subsides, there is left a discolored area that usually returns entirely to normal in the course of time. Where the deeper structures are involved or where there has been much in the way of bullae, there may be permanent scarring.

Constitutional Symptoms. Onset. The onset is usually sudden. It may be ushered in with a distinct chill, or there may be only a sense of chilliness. In the majority of cases, in a very few hours after the initial symptoms, the patient is experiencing all of the discomforts of an acute febrile process.

Fever. In the typical case the temperature is high, ranging from 102 to 104 or more, and usually lasts from four to seven days, when it subsides gradually, or it may drop by crisis. In either event there is some tendency to an occasional elevation for many days.

Pain. During the stormy period there is headache and general body discomfort. The site of the local lesion is often bitterly complained of, particularly if the involvement is of the ear or nose. It is not unusual to see patients moaning and tossing in delirium within a few hours of the first evidence of the invasion.

Laboratory Findings. There is nothing characteristic in the urine; there are often albumin and casts such as would be found in any acute febrile disease of severe character. The blood shows first a marked leukocytosis; later there may be a rather profound secondary anemia. The causative organism may be recovered from the local lesions; it is seldom found in the blood.

Differential Diagnosis.—Where the skin is involved, the diagnosis is usually established with ease. The wavy, raised, advancing margin, the sharp line of demarkation, the striking constitutional symptoms, often the history of a wound or of previous attacks, usually enable a positive diagnosis to be made early in the course of the disease.

Prophylaxis.—In preventing the spread of the infection to others, all of the usual methods of prophylaxis apply. The patient should be isolated, the attendants avoid contact with other persons as much as possible, and, under no circumstances, should they have the care of other patients, particularly those suffering from surgical conditions. A nurse handling a case of erysipelas should not take a surgical or obstetrical case for at least a week after coming off duty. During this interval all possible measures such as repeated baths, cleansing of the hands, and changing of clothes should be carried out. It has been stated frequently that the physician in charge of an erysipelas case should not perform surgical or obstetrical work; in the majority of instances, this restriction is not practical and is seldom observed. The physician should, however, avoid the possibility of becoming a carrier by the use of all known measures. He should wear a gown in the sick room and, in touching the patient or any material that might be infected, he should wear rubber gloves. The gown and gloves should be left after every visit to receive the proper attention. Before leaving the house, he should thoroughly cleanse his hands and, before doing any surgical or obstetrical work, he should let as much time elapse as possible. He should also in the surgical or obstetrical work wear a gown and rubber gloves. In my professional experience I have never known a case of erysipelas that could be attributed even remotely to a physician who was handling other cases of erysipelas at that time. In discharging a patient, the well known prophylactic measures should be carried out.

Treatment.—Many plans of treatment have been suggested, and most of them seem to have been attended by a certain amount of success, as evidenced by the generally low mortality. There is no specific, and success depends on the observance of the numerous details of the management.

General Care.—The patient should be isolated as completely as possible. No visitors, of course, should be allowed, and only those should come in contact who have the responsibility of the care of the patient and who will observe the necessary precautions to prevent the spread of the disease. It might be mentioned here that the nurse should be free from any lesions that might increase the danger of infection. In handling the case she should use rubber gloves and, if there are any slight abrasions on the hands of either the nurse or physician, they should be touched with tincture of iodine (or mercurochrome solution) after each possible exposure. The room should be selected with the idea in mind of absolute quiet, proper ventilation, lighting and heating. An open fireplace is highly desirable, not only for heating and ventilation, but as an aid to the disposal of infected matter. The convenience of nursing should also be considered, and, where possible, there should be a bath room opening into the treatment room, this bath room being for the use of the attendant only.

Diet.—The process usually runs a rather short course and the need of high caloric intake is not often encountered. In the protracted cases it becomes a factor of importance. During the period of high temperature, the diet may be somewhat as follows: Water, diluted fruit juices, simple carbonated drinks, coffee and tea, malted milk and similar preparations, buttermilk, strained broths and soups. As the temperature subsides, such articles may be added as milk, toast, gelatin, soft cereals, etc. There is often some gastric disturbance that may be quite distressing, and in these cases particular care must be exercised in the matter of diet. Water should be given freely throughout the course of the disease.

Internal Medication.—Many drugs have been recommended as more or less specific. It is probable that more cases have been overmedicated than neglected from this standpoint. During the period of pain and fever acetylsalicylic acid may be employed with benefit. It should be used only in sufficient amount to meet the definite requirements. For relieving the pain, many prefer codeine when it will meet the requirements, and in most cases nothing else in the way of pain relieving drugs is indicated. Codeine and acetylsalicylic acid may be combined, but in most cases about ¼ grain (0.015 Gm.) of codeine by mouth every three or four hours until the patient is sufficiently comfortable is all that is necessary. For many years iron in the form of the tincture of ferric chloride, and quinine, particularly the hydrobromide, have been used; where these do not cause discomfort, there is no objection to their employment, and it has seemed to many that they have a certain amount of clinical value. They are used in doses of 5 grains (0.3 Gm.) of the quinine and 30 minims (2 cc.) of the tincture of iron three times a day. The consensus of medical opinion is at present rather against the use of such medication.

Local Treatment.—The most common lines of treatment employed today are by ointments and the use of cold compresses. My preference is for the cold compresses, and of these I prefer normal saline. This is used by having a thick pad of soft gauze wrung out of ice cold normal saline solution and applied to the area involved. This is changed every five to thirty minutes, depending on indications. The patient should not be disturbed during sleep. Pure tincture of iodine has often been recommended either to be applied directly to the area involved or to the healthy skin surrounding the local lesions. If this is applied to the damaged area, there is often a marked irritation. It has seemed to me that I have obtained clinical benefit by the use of equal parts of the tinctures of iodine and aconite. Where there are no vesicles present, this is painted over the entire area and some distance beyond, twice a day, allowed to dry about fifteen minutes, then the cold compresses applied. Used in this way it does not seem to cause any local disturbance, but of course its actual value is a matter of question. Many have advocated the use of magnesium sulphate solution employed as just suggested for the saline.

Ichthyol is used either pure or in 25 to 50 per cent aqueous solution painted on the area involved or in a weaker solution in the form of wet compresses. It is also used as an ointment of 25 to 50 per cent in strength. The value of ichthyol here is being seriously questioned.

After convalescence is established, there is a tendency to scaling of the area involved, and plain cold cream applied freely and frequently meets every requirement.

Vaccine and Serum Treatments. These have been used extensively, particularly the various serums. Recent work indicates that an efficient serum is now available and has sufficient value to fully justify its use.

Complications.—These are rather infrequent in erysipelas, and when they arise may be met as the same conditions developing from other causes.

FURUNCULOSIS AND CARBUNCLE

General Statement.—This subject is often included under the head of surgical diseases of the skin, but as there is a treatment entirely non-operative and a large part of these cases are necessarily handled by the medical wing of the profession, it has seemed desirable to present a discussion of treatment here. The various factors of management are so similar in these two conditions, that they are considered together.

Definition.—The boil is a localized infection, usually involving a hair follicle, characterized by the formation of a central core which is later discharged and the process of healing established.

A carbuncle differs from a boil principally in the extent of the involvement. Instead of one center of necrosis there are several centers or "heads," varying in number from two to as many as a dozen, or more.

Incidence.—They affect all ages, races and conditions of people. They are much more common in early than in later life, and, apparently, occur more frequently among men than women. A boil may develop almost anywhere. There are certain sites, particularly the back of the neck, for which the carbuncle has a predilection, due to the anatomical peculiarities. It should be remembered that the same infection may produce a boil in one case, a carbuncle in another, and an abscess in another. It is not unusual to find all three processes existing in different areas on the same patient.

Etiology.—The exciting cause is bacterial; the predisposing causes have not been definitely established. Certain factors tend to lower an individual's resistance, among these are a general state of impaired health, improper diet, constipation, diabetes, and uncleanliness.

Course and Prognosis.—The boil runs a course averaging about seven days, and no plan has been discovered that seems to materially influence this duration. In certain clinics large series of cases have been carefully followed up and various measures tried out, such as a policy of non-interference and that of early incision. My own experience has been against incision.

The prognosis in boils is almost uniformly favorable. There may be a certain amount of scarring which is particularly undesirable in the cases of girls or of young women. There is a period of more or less disability and discomfort, depending upon the location.

The most serious complication is septicemia which, in the case of a staphylococcus infection, carries a very high mortality.

The carbuncle is a much more serious lesion. The discomfort is usually more severe, there is more pronounced constitutional reaction, the process is of longer duration, and the mortality is considerably higher. In old people the prognosis is grave; in any event, the disfiguration from scarring is much more extensive than in simple boils.

Symptoms and Diagnosis.—In the early stages it is hard to differentiate between boils and carbuncles, and it is sometimes difficult at first to differentiate these from some other local infections. As the condition progresses, the characteristic evidences sooner or later become quite definite.

The boil shows an elevation with a more or less conical top and a small cap, on removal of which the real opening is exposed, showing at the bottom the whitish material which represents the slough in process of formation.

The carbuncle involves a more extensive area and presents evidences of multiple centers of slough formation. Both conditions are attended with redness, swelling, local heat, tenderness and pain, the degree depending upon several factors, the principal one of which is the location.

There may be elevation of temperature, rigors, and such other general evidences of an infectious process as anorexia, nausea, vomiting, abdominal pain and general discomfort. These manifestations are all apt to be more pronounced with carbuncles. Both conditions show a leukocytosis and either may give evidence of renal irritation.

Prophylaxis.—The first consideration in prophylaxis is to keep the body resistance up by maintaining the best possible state of health. The second is to keep the skin clean. It should be remembered that these conditions are infectious and it is not unusual to see many members of the same family involved. It is essential, therefore, that care be taken to prevent the use by the infected person of common bath tubs, towels, or other media that may carry the organisms to others. The patient should avoid direct contact with others as far as possible.

Treatment. General Considerations.—The first step is a thorough investigation of the general condition of the patient; this includes, particularly, an examination to determine the presence or absence of diabetes. Should diabetes be found, the patient is given the proper intensive treatment. Foci of infection should be sought for and receive attention, if present. Any factors that interfere with the general health and welfare of the patient must be corrected, if possible; this includes such matters as improper diet and unhygienic surroundings. If the constitutional reaction is sufficiently marked, the patient should have the benefit of rest. If the lesion is located where any particular type of motion causes discomfort or might tend to cause damage, rest should be given to that extent; for example, if it is on the arm or hand, that arm should be carried in a sling. If it is on the leg, the patient should be at absolute rest. It is particularly desirable to avoid injury; for this reason, in the case of school children, it is usually better to keep the patient at home, as much discomfort and even damage might be occasioned by trauma.

Careful attention should be given to intestinal elimination without subjecting the patient to violent purging. Absolute body-cleanliness must be maintained and particular care exercised to prevent the discharge from the lesion coming in contact with other parts of the body. In children, particularly, it is desirable to keep the area so dressed that they cannot get the infection on their fingers and so spread it to other parts of the body by scratching or transmit it to others.

The diet must depend entirely upon the general condition of the patient. In most cases of simple boils it is only necessary to avoid dietary indiscretions.

General Medication.—Many plans of treatment have been suggested and a large part of the drugs in materia medica have been used at one time or another, but the value of any is questionable.

Diluted Nitrohydrochloric Acid is the most commonly employed today. The average adult dose is 15 minims (1 cc.) after each meal. It is given well diluted with water, taken through a tube, and the mouth thoroughly rinsed after each dose.

Yeast is extensively used. It is sometimes taken in relation to meals, but more commonly a cake in orange juice on first awakening each morning.

Among the other agents that have been suggested are the preparations of arsenic, calcium sulphide, quinine and tincture of ferric chloride.

Vaccines, both the autogenous and the stock preparations, are very largely employed. Their value is still rather undetermined.

Symptomatic Medication.—Where the pain is severe, sufficient codeine may be used to give temporary relief. Sometimes codeine and acetylsalicylic acid may be employed together; for example ¼ grain (0.015 Gm.) of codeine sulphate and five grains (0.3 Gm.) of acetylsalicylic acid, every three or four hours when needed. If the patient is restless and unable to sleep, barbital may be used alone or combined with the above. If there is anemia, iron in any acceptable form, either alone or combined with arsenic, nux vomica or other agents, may be used as indicated.

Local Measures.—Here is it probably best to consider the treatment of boils and carbuncles separately.

Boils.—A plan that seems to have some advantage is as follows: A dressing of resin cerate is spread upon a thick piece of cloth and applied to the lesion. It should be of such size that the application will be a little larger than the area of redness. If the lesion is located where the dressing may be rubbed off, it should be held in place with a pad of gauze and strips of adhesive. It should be removed about two or three times in every twenty-four hours. The lesion is not opened surgically and suction cups are not applied. As soon as the slough has definitely formed, it will be voluntarily discharged or may be gently assisted by the most careful possible pressure. When the lesion begins to discharge, the same dressing may be continued, but should be changed with greater frequency. As soon as the process of healing is established, plain dry dressing meet the requirements better than anything else. In some cases, where the local discomfort is quite marked, relief may be secured by the use, for a time, of hot or cold compresses.

Other Measures. Among those that have been suggested are Bier's hyperemia, suction cups, and various injections such as phenol and alcohol. Many applications are used among them being wet dressings of ichthyol, mercuric chloride and glycerine; and ointments such as ichthyol in various strengths.

Carbuncles.—The plan of treatment that has seemed to me to give the greatest relief and probably tend most to shorten the course of the process is that of hot wet compresses. When the lesion is located on the face, a non-staining solution as that of boric acid may be used; when it is located elsewhere, a solution of potassium permanganate (about 1:5000). This latter may be prepared by using a 3 grain (0.2 Gm.) tablet to a quart (1000 cc.) of hot water or the following prescription may be ordered.

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<tr><td>Potas. Permangan.,</td><td>gr. l</td><td>3|3</td></tr>
<tr><td>Aquæ Dest.,</td><td>q.s. f℥ij</td><td>60|0</td></tr>
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M.

Sig.—Use a teaspoonful to a quart of hot water.

The plan of application is somewhat as follows: The solution is made up fresh and some arrangement such as an oil stove or alcohol burner is arranged so as to keep it hot. A large pad of gauze or a folded towel is dipped in the solution and applied to the area, as hot as the patient can tolerate it. Another pad is prepared so that when the first is removed the second can be immediately applied. These should be changed about every three minutes for a half hour, when the last pad is allowed to remain in place so as to keep the area moist. It is kept there for about two and one-half hours when a fresh solution is prepared and the process is repeated. In other words, the hot applications are applied about half an hour out of every three hours, and during the period of rest the wet pad is allowed to remain in place. It gets cold, but it prevents the drying of the area. The degree of heat is regulated by the tolerance of the patient, care being exercised to prevent blistering. The antiseptic solution is recommended largely for the reason that it will tend to prevent the spread of the infection to surrounding hair follicles or abrasions. After the sloughs form, they may be lifted out with thumb forceps, care being taken to avoid the pain and possible damage resulting from forcibly tearing loose tissue that has not entirely separated. As soon as the sloughs have all been removed and granulation has set in, plain dry dressing may be used to advantage. It is not advisable to use dusting powders.

Other Measures. Among the surgical measures that are used are the injection of various drugs, such as phenol; the excision of the lesion and incision with curettement.

Complications.—The main complications are a general distribution of lesions and septecemia.

Should septecemia develop, it is treated as the same condition arising from other causes.

DENGUE

General Statement. Definition.—Dengue is an acute infectious disease that has a tendency to certain rather definite and characteristic manifestations, especially a skin eruption and headache.

Incidence.—No one is immune, but it is more common during the period of active adult life. In most sections of this country, at least, the disease is seldom seen, except in the course of rare epidemics.

Etiology.—The specific organism is as yet unknown. It has been fairly well demonstrated that the transmission is through an intermediate host, the mosquito. This is of major importance with regard to prophylaxis.

Course and Prognosis.—The course is rather characteristic in the majority of instances. The tendency is to a preliminary period of fever, lasting from three to five days, an intermission of about twelve to thirty-six hours, then a return of the fever, lasting two or three days, making the total period average about eight days. Many cases run a much more rapid course and some are prolonged considerably beyond the time mentioned.

The mortality from dengue is almost zero and the disease is of importance principally because of the discomfort and disability that it entails. In some epidemics so large a percentage of the people are affected as to tend to disorganize business in general and entail considerable economic loss.

Symptoms and Diagnosis.—Many cases of this, as of most other diseases, are atypical, but such a large percentage are sufficiently characteristic that an epidemic is easily recognized. Individual cases are sometimes in doubt even in the presence of an epidemic.

Onset. This is apt to be abrupt, often beginning with a rigor or even a distinct chill. The type of this will be discussed later. Sometimes there is a preliminary period of malaise for some hours or even a day or two, but unlike some other diseases, the characteristic evidences are more apt to be present when the patient is first seen.

Chill (or Rigor). The disease is usually ushered in with a rigor, or even a distinct chill. This is not often of a violent character, as seen in malaria, but is more prolonged, and in many instances there is a distinct sense of chilliness lasting for ten or twelve hours. In the majority of cases a definite chill with the chattering of teeth and shaking is absent.

Sweats. There is the usual sweating following the chills or rigors. In addition to this there is a distinct tendency to a persistant diaphoresis that may last for days.

Fever. The temperature is usually high, ranging from 102 to 104. The rise is rather sudden and gradually subsides towards the end of the first period.

In the second stage of fever the temperature does not usually run as high as in the first, the average elevation being about 101 or 102, and the tendency is for this to subside gradually. Of course there are many exceptions in which the temperature may be considerably lower than this or even higher.

Pain. The pain may be divided for discussion into head pain and body pain.

The head pain consists principally of an intense frontal headache. It is almost uncanny to note the consistency with which these patients will draw the fingers across the lower part of their foreheads, about the region of the eyebrows, when asked where they hurt.

There is also a marked discomfort in the eyes. The expression is very common that they "feel as though their eyes were being pushed out." The patient complains not so much of an eye pain as of discomfort back of the eyes. They may at times describe a sensation of "burning" in the eyes.

There is a fairly constant pain, or dull discomfort, in the back of the neck or occipital region. Many patients describe a pain at the base of the skull, ranging down the back of the neck. It is quite common, when asked where the pain is, to have them place one hand on the lower part of the forehead and the other on the lower occipital region.

This frontal pain, particularly, is of an excruciating character and highly resistant to treatment. It is more pronouced in the beginning of the disease and is largely confined to the first period of fever.

The body pain may be more or less general, but is especially severe in the back. The region of maximum intensity seems to be in the lumbar muscles. A very common complaint of these patients is that they are unable to get in a comfortable position on account of this pain. This, also, is more pronounced during the early days of the disease.

In many cases there is a discomfort in the joints, particularly the knees and elbows. There is no swelling or local heat that would indicate an arthritis. This is not particularly violent and is relatively transient in character.

Nausea. The most characteristic type is a dull, persistent nausea with little or no vomiting. It usually lasts for several days. In many cases it does not manifest itself until the second or third day of the disease. One unfortunate result of this is that the patient will often feel that it is the medication that has precipitated the nausea. Sometimes this complaint is rather bitter.

Abdominal Discomfort. Often there is much abdominal discomfort, which may be either pain, or tenderness, or both. A rather mild degree of tenderness on pressure is probably the most frequent finding of this character.

Anorexia. As might be expected from the tendency to nausea and abdominal discomfort, there is an almost total loss of appetite. This is particularly noticeable in the first few days of the disease.

Nervousness and Insomnia. There is marked restlessness and nervous irritability. The tendency is not only for the patient not to lie quietly in bed, but to complain bitterly of noise, light, or any form of disturbance.

The insomnia seems to be out of proportion to the other nervous manifestations. In a fairly large percentage of cases it is almost complete for the first two or three nights. This symptom is also highly resistent to treatment.

Eruption. Early in the disease, about the time the patient is first seen, there is a tendency to a general redness. Sometimes this is of the character of a scarlatinal flush. This usually subsides during the first two or three days.

With the return of the second stage of fever, there is usually more or less of a fine, discrete rash; rather resembling that seen in measles, though it is not ordinarily as pronounced or as general in its distribution. It is most often found on the upper part of the chest, the face, arms, hands and feet.

At times there would seem to be an accentuation of this eruption around the joints, particularly those that are the site of discomfort.

In some cases this is due to the local measures that have been instituted for the relief of pain.

Prophylaxis.—In the light of our present knowledge that the disease is mosquito-borne, it is certainly desirable to have the patient in a screened room. Even if in a screened home, the bed should be protected with mosquito netting, if possible.

Treatment.—There is no specific, and little in the way of routine treatment that seems to be of value. Attention must be largely confined to general care and symptomatic relief.

General Care.—The patient should be kept in bed throughout the entire course of the disease. In the milder cases there is a tendency for the patients to want to get up when the first stage subsides. Rest should be absolute; both mental and physical. It is particularly desirable to exclude visitors, business cares, domestic worries and all noise, and it is usually better to have the room darkened.

The usual attention should be given to the care of the skin, mouth, etc. Mild intestinal elimination should be maintained, by laxatives if needed. Milk of magnesia or liquid petroleum serve well in the majority of cases if anything at all is indicated.

When the patient is not nauseated, rather large amounts of liquids should be encouraged.

Diet.—As the course of the disease is short, a high caloric intake is unnecessary. As there is a tendency to nausea and abdominal discomfort, particularly during the first few days, it is usually safe at this stage to leave the question of nutrition largely to the desires of the patient. A diet list that meets the usual requirements in the beginning is as follows:

Water, carbonated waters, ginger-ale or other simple carbonated drinks, tea, coffee, fruit juices, strained soups or broth and malted milk. This diet may be augmented as the condition of the patient improves.

Symptomatic Treatment.—During the period of chill, or rigor, effort should be made to keep the patient comfortably warm. Cool drafts should be excluded and the patient warmly covered; hot water bottles or an electric pad contribute greatly to comfort. During this stage hot drinks, such as tea and coffee, are usually preferred to cold.

Fever. After the chilliness subsides and the patient begins to complain of a feeling of heat, the hot applications should be withdrawn, an ice bag placed to the head, the covering adjusted to meet requirements and freer ventilation provided. During this stage, cold drinks are more gratifying to the patient.

In the way of medication, acetylsalicylic acid is the most efficient remedy. This may be given in about 5 grain (0.3 Gm.) doses, every three or four hours, until the patient is more comfortable. As the temperature and incident discomforts subside, the size of the dose may be lessened or the intervals between doses increased.

Sweats. There seems to be no specific treatment for the sweats of this disease. Frequent baths, followed by sponging with witchhazel or diluted alcohol, contribute to comfort. The clothing may be changed as indicated. There is a marked tendency to profuse sweats and sometimes this symptom may be more or less constant for several days.

Pain. The two drugs of most value are codeine and acetylsalicylic acid. These may be ordered together or separately, as indicated. Probably the preferable plan is to give about 5 grain (0.3 Gm.) doses of acetylsalicylic acid every two to four hours until relieved and to order ¼ grain (0.015 Gm.) tablets of codeine phosphate separately. Let the codeine be given with the aspirin when indicated by pain of sufficient intensity. The following prescription may be ordered:

℞	or		
Codeinæ Sulph.,	gr. iij	0	2
Barbitali,	gr. xx	1	3
Acidi Acetylsal.,	g. l	3	3
M. ft. cht. no. x.			
Sig.—One every three hours till relieved.			

Sometimes a hypodermic of morphine is necessary to get these symptoms under sufficient control and then effort made to continue the effect by the use of milder measures.

The pain in the back may be relieved to some extent by massage with some counter-irritant, such as chloroform liniment.

Nausea. An important part of the treatment for this is included in the general care of the patient; that is, rest, freedom from noise and excitement, a darkened room, an ice bag to the head, careful regulation of the diet, and proper intestinal elimination. In the way of direct treatment, sodium bicarbonate with vichy or seltzer is useful. Small doses of ginger ale may give a certain amount of relief. In some cases codeine contributes to the relief of this symptom, possibly by promoting rest and sleep.

The effervescing tablets of bromides, or bromides in some other form, have the same tendency to give relief here as in most other cases of nausea. As a rule, however, the treatment of this symptom is rather discouraging.

Abdominal Discomfort. The same measures apply here as suggested for the general care of the patient in the preceding paragraph. Careful diet and carefully regulated intestinal elimination are particularly indicated. Sometimes warm enemas of a non-irritant type give relief. The other measures that are being instituted for pain and insomnia seem to meet the requirements for this discomfort also.

Nervousness and Insomnia. These are highly resistant to all treatment. The agents most employed are codeine, barbital and bromides.

Eruption. There is sometimes itching or other discomfort of the skin as the eruption begins to subside, particularly if it has been extensive in distribution. This may be relieved by frequent baths, followed by sponging with witchhazel and massage with cold cream.

Complications.—There are no complications of any material importance. A mild nephritis is occasionally noted, but this is not usually of a severe type and should be handled the same as a nephritis following any other acute infectious disease.

MALARIA

General Statement.—Malaria has been a scourge of the ages. It has probably had as much to do with moulding history and changing the map of the world as any other one disease. It has been claimed as the cause that undermined the glories of ancient Greece and Rome. It was certainly a deciding factor in the defeat of the great effort of DeLesseps to unite the two oceans.

It not only in its acute manifestations has destroyed its millions, but in its chronic form has impaired the health and lowered the efficiency of infinitely more.

It gets its name from the words "mal" (bad) and "aria" (air), as it was supposed to be the result of breathing certain types of impure air. In looking back upon the days of ignorance as to its cause, it is easy to understand how this idea could have prevailed.

Many names deserve to be mentioned in the history of the development of our present knowledge of the disease, and chief among these is that of Laveran who in 1880 announced his epoch making discovery of the causative organism.

The next greatest step forward is largely to the credit of Ross who in 1898 definitely fixed the responsibility for the transmission of the disease on the mosquito.

Another advance was that of Bass, who succeeded in cultivating the organism, extra vito.

Definition.—Malaria is a febrile disease resulting from the propagation in the blood of the specific plasmodia.

Three distinct types of the disease are recognized in this country; tertian, quartan and estivo-autumnal. Many subdivisions of these are recognized, but in this article the disease will be discussed only under these three.

Incidence.—No group of humanity is immune should they be subjected to the infection. As the disease is transmitted only through an intermediate host, the anopheles mosquito, it is not acquired except in those sections where this mosquito is found. This includes however a good part of the tropical, sub-tropical and temperate zones of the world. The disease is much more prevalent in some sections than in others, owing to the combination of many factors that can well be understood.

Etiology.—The exciting cause is some type of the specific plasmodia The predisposing causes all center around being exposed to receiving the infection from an anopheles mosquito that has previously removed blood from an infected person.

Course and Prognosis.—In untreated cases some few develop sufficient resistance to overcome the infection. The tendency, however, is to succomb as a result of the acute infection or to pass into a chronic state in which the general well-being of the individual is materially affected.

In properly treated cases, as we know the disease in the United States, a cure is certain and symptomatic relief almost immediate, except in those instances that are seen after the disease has made such ravages as to have produced pathologic conditions beyond the hope of immediate repair.

Symptoms and Diagnosis. History. It is impractical to make a thorough search for the spasmodia in every case of sickness coming under observation and in many sections of the country, particularly, the disease is so rare as to make such measures unnecessary.

A history of exposure is of considerable importance in directing attention to the possibility of malaria. A patient who is at present or who has within recent times lived, in a section where malaria is endemic, should certainly have the benefit of a thorough investigation with this condition in view. In many sections of the country, malaria must practically always be eliminated either as the main cause of the symptoms or as a complicating factor.

Paroxysms. Onset. There may be a distinct prodromal stage of discomfort; such as malaise, headache and anorexia, or the first evidence that the patient recognizes may be a distinct chill.

Chill. The chill is a characteristic symptom of the disease. In the tertian type, the tendency is to a chill every other day; in the quartan type, a chill every three days, and in the estivo-autumnal type, the chill may be at more or less irregular intervals or the patient may not experience a definite chill at all.

In a case of double infection, the chills may be at more frequent intervals; for example, in a double infection of the tertian organism, the patient may have a chill every day.

The chill is usually of a violent character and persists for a varying period, probably an average of about half an hour, after which it subsides and is followed by an elevation of temperature.

Fever. There may be a prodromal stage of fever previous to the onset of definite paroxysms as evidenced by a chill. Following the chill, there is a rapid rise of temperature. This is usually high, reaching from 103 to 105 or more. The duration is somewhat variable, probably averaging six to eight hours, when it usually subsides until the next paroxysm. In the estivo-autumnal type, particularly, the temperature may run an irregular course.

Sweat. Following the fever, there is a period of sweating. In the ordinary type of the disease, there is comparative comfort following this until the next paroxysm.

Pain. There may be a prodromal period of headache and other discomforts, and during the paroxysms the headache and body pains are often intense. The period of pain lasts throughout the chill and fever, subsiding entirely or in part during the stage of sweating.

Pulse. The pulse is rapid, but usually not out of proportion to the temperature.

Physical Findings.—There are no definite findings upon physical examination that indicate malaria in its early stages. Later on there are usually evidences of anemia, splenic enlargement and other findings, such as loss of weight, coated tongue and sallow complexion.

Laboratory.—The finding of the plasmodia in the blood is the only positive evidence of the presence of the disease. There are increasing indications of the destruction of the red cells.

Diagnosis by Therapeutic Tests.—In the hands of a laboratory expert, the diagnosis can usually be left to the blood examination. Sometimes repeated examinations are necessary to demonstrate the organism. When a highly trained expert of undisputed ability is not in charge of the laboratory investigation, the same dependence can not be placed on this method of diagnosis, and sometimes it is advisable to put the patient on the treatment for malaria and be guided by the clinical results.

Diagnosis by Elimination.—Where expert laboratory aid is not available, an important factor in diagnosis is often the elimination of other possible causes that would account for the symptoms manifested by the patient.

Prophylaxis.—This may be considered under the heads of State and personal.

Personal prophylaxis may be best considered from two standpoints: First, to prevent the patient's spreading the infection; and second, those measures that will tend to prevent a well person from acquiring the disease.

State Prophylaxis.—This embraces those legal measures that are directed towards preventing the disease. These include such matters as the reporting of cases and, in many places, certain restrictions upon those infected. The most important part of State prophylaxis is the elimination of the breeding places of mosquitoes.

Personal Prophylaxis.—Infected patients should be promptly treated, and thoroughly screened so as to prevent their infecting mosquitoes.

Well persons who are exposed to the infection by residing in a community where the disease is endemic, may protect themselves to a certain extent by avoiding exposure to the bite of the anopheles, particularly in the late afternoon, night and early morning hours.

The prophylactic use of quinine is still a disputed question. It certainly would not seem to be practical for those persons who are living in malarial sections. Where a person must be in a malarial section for only a few days, the use of quinine would seem reasonable.

Treatment.—The treatment of the disease is best considered under two heads, that is, specific treatment and symptomatic treatment.

Specific Treatment.—Quinine as such or in the form of cinchona bark has been in use for several hundred years by the white race. It was probably used for an indefinite time before that by some of the natives of South America, although probably it was not employed generally by them. It was first used, of course as cinchona, either the crude bark or preparations of the crude bark being employed. At the present time the salts of quinine are used exclusively.

Salts of Choice. Quinine sulphate is used many times as much as all of the other salts combined and it meets all of the requirements. There are some physicians who prefer some of the other salts. The hydrochloride is advocated by some, because it is supposed to be handled better by the alimentary tract. The hydrobromide is used by others, because it is claimed that its use is attended by less discomfort. Such contentions are probably without merit and uniformity is certainly desirable.

Standard Treatment. Within recent years those individuals and organizations particularly interested in the study and treatment of malaria have decided upon a course of treatment that is known as the "Standard Treatment." All teachers, writers and practitioners are urged to favor, as far as possible, the adoption of this plan for the reason that it meets all the requirements and its adoption will lessen the large percentage of under-treatment and over-treatment that is prevalent today.

The plan calls for an adult dosage of ten grains of quinine sulphate, three times per day, for a minimum period of three days or until the clinical symptoms have subsided; then ten grains of quinine sulphate each night for a minimum period of eight weeks, but longer if indicated.

In proportioning the dosage for children, it is urged that they be given slightly larger doses than is called for by the usual method of calculation.

Special Considerations. The adoption of this standard treatment is a great step forward in therapeutics and it will be productive of an enormous amount of good. It seems almost unwise and unfair to suggest any deviation. I believe, however, that after this plan of treatment has become sufficiently fixed in the minds of the medical profession, that it will be permissible, and even desirable at times, to consider more individualization than is now advocated by some of its proponents.

The object of the treatment is to sterilize the blood so far as the plasmodia is concerned. This is done by getting into the blood a certain concentration of quinine; in other words, so much quinine to so much blood. It is the same proposition as sterilizing fluid anywhere else. If a certain amount of disinfectant is necessary to sterilize a certain amount of liquid, twice as much disinfectant would be used to sterilize twice as much liquid.

The amount of blood in the body may be fairly well calculated from the body weight. There are no material differences that would exclude from this form of calculation for men, women or children. It seems to be logical, therefore, to base the dose of quinine on the probable amount of blood to be treated (weight of patient). If thirty grains of quinine is the proper dosage for the average individual (about 150 lbs.) during the period of intensive treatment, patients who are much larger or smaller than the average should receive more or less quinine in proportion.

It does not seem entirely necessary to give the same amount of blood disinfectant to a patient who has eight pints of blood as to one who has sixteen.

In the case of children I do not see the advantage of the age calculation of dosage. It is merely a matter of the weight of the patient.

Writers on the subject of malaria have urged that larger proportionate doses of quinine be given to children than are employed with most other drugs, for the reason that the doses proportioned in the usual way do not seem to meet the requirements. This rather corroborates the present contention.

Using Young's rule, a child one year old would get one-thirteenth of the adult dose, while, as a matter of fact, a child one year old usually weighs about one-seventh of the adult weight.

This leads to the mild suggestion that in proportioning the dosage for children and for adults who deviate markedly from the normal, we may give, during the period of intensive treatment, one grain of quinine sulphate after each meal (3 times a day) for each 15 pounds of body weight; and, in the later treatment, this amount each night at bed time.

Aids to Administration. The standard treatment of malaria presupposes the administration of the drug by mouth. Where this is attended with any material discomfort, measures may be instituted looking towards its prevention.

The most common manifestations are headache, ringing in the ears, dizziness and nausea. These are probably best combatted by the bromides. From 30 to 60 grains (2 to 4 Gm.) of sodium or potassium bromide per day, during the intensive treatment, usually meets the requirements.

When the patient is taking only one dose per day and that at bed time, there is seldom any discomfort, but if there be any, twenty to thirty grains of bromide given about two hours before the quinine, will usually give sufficient relief.

Methods of Administering Quinine. By far the preferable way is to give the drug in common, hard capsules, to be taken by mouth. When a quick effect is particularly desirable, these capsules may be perforated with numerous pinholes.

The main objection to giving quinine in solution, as has been so well suggested by Bass, is the difficulty in getting the patient to take it for a sufficient length of time. They will usually take it without trouble during the stage of acute illness but the tendency of many is to discontinue such a disagreeable treatment as soon as the urgent necessity has passed.

When the patient is in coma or suffering from some of the grave forms of the disease, so that they are unable to take medicine by mouth or where immediate action is urgent, the quinine may be given intravenously until such time as the patient can take it by mouth. The average adult dose given in this way is about fifteen grains, repeated every twelve hours.

The salt of choice here is the bihydrochloride, dissolved perferably in sterile normal saline solution.

In some cases it may be necessary to give the drug hypodermically. This is seldom, if ever, excusable in treating adults. In the case of children, it may at times be impossible to give an intravenous injection. The drug should be used in this way only until it can be taken by mouth. Two main objections to this form of administration are the uncertainty of absorption and the tendency to local reaction, sometimes resulting in large sloughs. A tendency to tetanus has also been suggested.

Administration to Children. Usually children can not take capsules until they are from six to ten years old. In these cases it is probably better to give the drug in suspension. For this purpose, the sulphate is certainly preferable. Its solubility is slight (1 to 725), so only about one-half grain will dissolve in an ounce of syrup. As only that in solution is tasted, it is fairly easy to disguise the small amount that is here dissolved. For example:

If two grains to a teaspoonful is prescribed of a soluble salt, the whole two grains will go into the solution. In the case of the sulphate, only about one-sixteenth of a grain would be dissolved in a teaspoonful of the preparation. It will be readily seen, therefore, how much easier it will be to disguise the taste if the sulphate is used.

In selecting a vehicle for disguising the bitterness, there are three which are most commonly employed, namely, syrup of chocolate, syrup of licorice and aromatic syrup of yerba santa. When one of these is employed preference should be given to the choice of the patient. Syrup of chocolate is by far the most universally satisfactory.

Some prescriptions are given below.

For an adult

℞
Cap. Quininæ Sulph. (5 gr.), no. CL
Sig.—Take as directed.

For a child requiring ⅕ the adult dose.

℞		or
Quininæ Sulph.	ʒj	4|0
Syr. Chocolatæ, q.s.	f℥iv	120|0

M.
Sig.—(Shake-label.) Teaspoonful as directed.

Full written instructions should be given the patient or nurse as the available label space is inadequate.

Bass has emphasized the desirability of prescribing the full course of treatment at one time. This applies particularly to those patients who are not under regular medical supervision. The reason for this is that patients will usually take all the medicine that they have, while they often will not have a prescription refilled. In prescribing a syrup for children, it is probably best, unless there are reasons to the contrary, not to order too much on account of the danger of deterioration.

Time of Administration. The use of quinine should be begun as soon as the diagnosis is made. The old custom was to wait and give the medicine a few hours prior to the expected paroxysm. It has been conclusively proven that the organisms are impaired at any stage of their development by a sufficient amount of quinine in the blood. If a patient is seen during a paroxysm, particularly in its early stage, and quinine is given immediately, the next paroxysm may be slight or even entirely missed.

Other Suggested Medication. Many other agents have been recommended in the specific treatment of malaria. It is rather hard to reconcile the statements of some excellent physicians with the facts as some of us see them. Particularly during the last war, reports were published from various army hospitals stating that many cases of malaria failed to yield to quinine treatment.

Personally, I have never known a case of the ordinary type of malaria, that was seen even approximately early, in which the clinical symptoms did not subside within seventy-two hours. I have never had a patient to have more than one chill after treatment had commenced.

In New Orleans, Bass has conducted some rather extensive investigations into cases that were reported as not yielding to the quinine treatment. In every instance it was found that there had been some element of error. For example: In one case the physician had ordered the treatment, but the interne had failed to write up the order. In another, the medicine was given to the patient who pretended to swallow it, but threw the medicine into a waste receptacle.

Among the other drugs that have been used are the arsenic preparations, particularly arsphenamine and sodium cacodylate.

Symptomatic Treatment.—It is certainly desirable to give the patient temporary relief. During the period of the chill a considerable measure of relief may be afforded by a hypodermic of codeine. This effect also carries over into the stage of fever, lessening the headache, body pain and other discomforts. Spirit of chloroform has been used for many years for lessening the discomfort during the chill. It is usually given in doses of about one fluidrachm (4 cc.). During this period the patient should be kept as quiet as possible, and sufficient covering, hot water bottles, or an electric pad employed. Fresh air should be allowed of course, but during cold weather direct drafts should be avoided.

During the period of fever, if the codeine has not been administered, it may be given at once. Acetylsalicylic acid, 5 grains (0.3 Gm.) every hour until the patient is more comfortable or until fifteen or more grains have been given is often of advantage. During this stage of fever the patient requires less covering. Free ventilation, perfect quiet, a darkened room, and an ice bag to the head is indicated.

Nausea and vomiting, if present, may be relieved by cracked ice, carbonated drinks, particularly small amounts of ginger ale, and by other measures previously suggested.

General Care.—The patient with malaria is an ill individual and should be treated accordingly. Where the disease has manifested itself in the form of definite paroxysms, with complete intermissions, a certain amount of liberty in the matter of diet and activity may be permitted during the intermissions, but at no time should all restrictions be removed. It is certainly better, until the case is under thorough symptomatic control, to have the patient rigidly confined to bed in a screened room.

After the case is under clinical control by means of specific treatment, an effort should be made to get the patient back into a state of well-being as rapidly as possible. This is particularly sought by the use of proper diet, modified activity and other general attention.

There is very often considerable loss of weight, general weakness, and a more or less advanced secondary anemia. These may call for the use of iron, arsenic or strychnine, or some of the various combinations of these.

Diet.—This has been touched upon to a certain extent in the preceding discussion. There is no special type of diet that applies to this condition and we must be guided here, as in any other case, by the condition of the patient.

Anyone who is ill should have a modified diet adjusted to meet his particular requirements. In a very large percentage of cases, the disease is under symptomatic control within forty eight hours and during this short period the necessity for nutrition is negligible and the main consideration is not to give food that could possibly be a disturbing factor.

In those cases where the patient is having the paroxysms at definite times, when the diagnosis is made the quinine treatment will be started at once. It may not be possible to prevent the following paroxysm and it is certainly desirable to have the digestive tract free from undigested food should the paroxysm develop.

It is extremely rare for more than one definite paroxysm to occur after the diagnosis is made, so a short period of preparatory semi-starvation is certainly of no particular disadvantage. During this time the patient can partake freely of fruit juices, soups, broths, carbonated drinks, tea, coffee, malted milk, and in fact sufficient to meet the requirements for the short period.

As soon as the case is under clinical control, the diet may be rapidly increased.

Another advantage of care during the beginning of treatment is that when the patient is taking large doses of quinine, this drug is more certainly assimilated if the stomach is free from an excess of undigested food.

TYPHOID FEVER

General Statement. Definition.—This is a disease caused by the invasion of the body by the bacillus typhosus. While it is a general disease and many structures may be involved, the principal areas affected are the lymph follicles of the intestinal tract. There is a rather characteristic symptomatology and course that are often included in the definition.

Incidence.—The disease may affect any race, age, kind or condition of people. It is more common at certain seasons, as the spring and fall; also in some localities than in others, due largely to hygienic conditions. It is more frequent in early adult life, the majority of cases occurring between the ages of fifteen and thirty years. It is much less common now than in previous generations, as a result of two factors, the use of the specific vaccine, and the improved hygienic conditions under which people live.

Etiology.—The exciting cause is the specific organism, the bacillus typhosus. Many contributing factors are of more or less importance, as age, season, and locality.

Course and Prognosis.—The present mortality is about 10 per cent, which includes all types and conditions of patients. In private practice, particularly among those who can command the necessary facilities for treatment and who have the custom of seeking medical advice early, the mortality is probably not over 5 per cent. The disease is of enormous importance not only from the standpoint of the mortality, but because of the prolonged disability and direct and indirect economic losses entailed. The usual duration has been given by Jennings, Moss, and others, as about five weeks, divided somewhat as follows:

First week, increasing symptoms
Second and third week, the crest of the disease
Fourth week, decline of symptoms
Fifth week, definite establishment of convalescence

It may run a much shorter course than this or one much longer or be protracted indefinitely by complications. There is a marked tendency to recrudescences.

The causes of death are usually—1. Toxemia; 2. Exhaustion; 3. Complications.

Among the complications of most importance are hemorrhage and perforation.

Symptoms and Diagnosis.—Typhoid fever is so protean in its manifestations and the atypical course is so frequently met with, that it is inadvisable to impress upon the mind a definite train of symptoms that should be arbitrarily expected. All that can be done is to give in a general way those conditions that are more or less frequently met with in the course of the disease.

History. Of particular significance here is the statement of possible exposure; that is the patient being from a community where typhoid is endemic or epidemic; or having been in contact with those having the disease.

Of unlimited importance also is the information as to whether or not the patient has previously had typhoid, or has been immunized against it. Sometimes this history is hard to obtain with sufficient accuracy to be of much value. The investigation should be thorough in reference to any preceding, protracted indisposition.

Onset. The incubation period probably averages from ten to fourteen days although it may be a much shorter or longer time than this, many cases having been reported as developing within three or four days and some long after the fourteenth, therefore this merely expresses the probable average. The actual onset may be sudden or insidious. It is highly probable that those cases that are apparently stricken suddenly and found with high temperature, convulsions or coma, are those that have been sick for some time with the disease and in the face of increasing indisposition have carried on their activities until prostrated. The usual case presents a prodromial period of approximately from seven to ten days, during which time there is malaise, anorexia, vertigo, and lowered efficiency. The first definite symptoms putting the patient to bed are often a chill, or a sense of chilliness, headache, general body discomfort or abdominal pain and tenderness.

Fever. This, of course, is a constant finding, though it is one that presents a wide range of variation. There is a tendency for the temperature to rise during the first week of the actual disease, but the rise is not continuous, and the graphic chart may present marked irregularities. Usually the fever persists for something like two weeks at a fairly high level, gradually declining during the latter part of the third week or the fourth or fifth weeks by lysis. In the most favorable cases the temperature may reach normal during the third week, may run a few normal days during the fourth week, and reach a permanent normal during the fifth week. In some cases the temperature may never go above 102 or 103, in others there may be long periods ranging from 104 to 105. Remissions and recrudescences, as previously suggested, are very frequent.

Pulse. The most characteristic tendency is for the pulse rate to be slow, out of proportion to the temperature elevation. Sometimes this may be quite marked, particularly in the early days of the infection. A little later, about the end of the first or during the second week, there is a marked tendency for the pulse to become dicrotic. As exhaustion develops, the pulse rate often rises and, in the presence of complications, the rapid pulse is often of marked diagnostic importance.

Blood Pressure. There is a general tendency to low blood pressure.

Pain. One of the outstanding discomforts is headache; this may be distinctly resistant to treatment. On the other hand, it is often completely absent. There may be considerable body pain, as would be expected from any febrile process. Later on there may be discomfort in the back or lower limbs, due in a large measure to pressure. There is almost always, sooner or later, abdominal pain and tenderness, which is often referred to the right lower quadrant, especially early in the disease.

Alimentary Symptoms. Among those frequently found are nausea, vomiting, anorexia, constipation and diarrhoea. As convalescence is established, there is a tendency to excessive appetite. Abdominal pain and tenderness has been discussed elsewhere.

There is a rather marked tendency to the accumulation of sordes in the mouth. The tongue is at first coated, often the red papullae showing through this coating gives the typical "Strawberry tongue." Many claim a rather marked tendency to pointing of the tongue, which accentuates the strawberry appearance when it is protruded. Later the tongue may become dry, red, and show a tendency to crack. The breath may be disagreeable.

Nervous Phenomena. There are no characteristic evidences here, but among those conditions that may be found are insomnia, nervousness, delirium, delayed cerebration, and the so-called typhoid state; this latter condition might be said to include the delayed cerebration. This delay is particularly noticeable when a question is asked, for there may be an appreciable lapse of time before the answer is given. In the present plan of handling these patients, it is not unusual to have a large percentage go through without delirium or other material inconvenience of this character. It is possible that many of the nervous manifestations in previous years were really the result of starvation.

Epistaxis. This is by no means constant, but does occasionally develop.

Appearance. These patients look sick, and beyond this there is nothing characteristic.

Skin. There is a decided tendency to perspiration, and often there is mentioned a "typhoid odor." This odor is probably the result of dried prespiration, fecal contamination, or bad breath, in those who do not get the benefit of proper handling.

A typical "rose spot" eruption usually develops during the early part of the second week and may continue for a week or more, coming in successive crops, each lasting a few days. These lesions may number from two or three up to several dozen, and they are found particularly on the abdomen and chest, though they may be present almost anywhere on the body. In character they are maculo-papular. They may be felt by touch, but disappear on pressure. They occur in about two-thirds of the cases. Care should be exercised to differentiate from insect bites and acne.

Abdomen. This at first is tender and there may be pain. This discomfort is most often, particularly in the early days, referred to the lower right quadrant. During the course of this disease, there is a marked tendency to distention, in fact, this is one of the manifestations most troublesome to combat.

Spleen and Liver. The spleen is practically always enlarged. The liver may at times be felt. In case of distention, it is often impossible to palpate either organ.

Respiratory Tract. There is a marked tendency in the early days of the disease to a bronchitis or other respiratory involvement. It is not unusual for the temporary diagnosis to be bronchopneumonia. Almost any physician of large experience can look back on this error.

Hair. There is a tendency for the hair to fall out. This is probably more pronounced here than in other febrile processes. Practically always the hair returns when convalescence is established but it may, however, be of different character. For example, the patient who previously had curly hair may find the new growth to be straight.

Laboratory. It is here that the diagnosis is definitely established, though in most instances a tentative diagnosis may be made with reasonable certainty before definite laboratory evidence is obtained.

Urine. During the course of the disease there may be albumin, casts, leucocytes, acetone and diacetic acid.

Blood. As the disease progresses, there is a distinct tendency to a secondary anemia. Of marked importance is the white count, which usually shows a reduction both in the total white and the neutrophiles. This low count in the presence of high temperature excludes the majority of other diseases. Blood culture may demonstrate the specific organisms but a negative report does not exclude typhoid fever. In the average laboratory, a majority of cases show negative cultures and practically always after the tenth or fifteenth day of the disease. The Widal reaction is the one most to be depended upon for confirming the diagnosis. It is highly desirable to have this test made early in the disease, and, if it is then negative, a later positive reaction is more definitely confirmatory of present typhoid, as vaccine or previous disease would not give a negative reaction at one time and a positive one later. While the first test should be made early, for reasons just stated, the positive reaction does not usually develop until the latter part of the second week or the early part of the third.

Differential Diagnosis.—Among those conditions that might be most confusing are malaria, syphilis, tuberculosis, endocarditis, and meningitis. Of course, many others at times will have to be eliminated. The positive blood culture or the positive Widal will almost always sooner or later establish a diagnosis. They are of particular importance in differentiating such conditions as tuberculosis and syphilis. Endocarditis and meningitis can be eliminated in most instances by the low total white and neutrophile count of typhoid, as compared to the high count in these two conditions. In endocarditis we would find, as a rule, evidences of cardiac embarrassment. In meningitis the spinal puncture is absolute. In syphilis the Wassermann reaction, the history, the local lesions, etc., usually leave little doubt. The main trouble is where syphilis and typhoid are coexistent, and the investigator is satisfied by finding one of these processes, overlooking the other. In malaria the blood examination, taken together with the periodicity and the other available data, practically always promptly clears any doubt. In tuberculosis the absence of the blood findings of typhoid fever, together with the cough, pulmonary changes, sputa findings, and other evidence, usually are sufficient to promptly meet the requirements for diagnosis.

Prophylaxis.—Prophylaxis may be divided into State and Personal measures.

State Measures.—These include prompt reporting of all cases and the investigation of possible sources. Also such matters as purification of water supply, attention to dairies, markets, distribution of vegetables, etc. The medical profession should certainly lend its influence to seeing that the proper legislation in these matters is enacted and carried out.

Personal Measures.—The first and most important step here is immunization with the specific vaccine. It seems pitiful to think that while universal vaccination would immediately and permanently stamp out this disease, that we still have thousands of deaths annually. It may be safely said that a physician who does not lend his influence for vaccination against typhoid fever is derelict in a sacred obligation. It is useless here to recount the marvelous reduction in the death rate, as this can be seen by comparing statistics showing the mortality among soldiers during the late war when vaccine was universal and during preceding wars, particularly the Spanish-American. The physician in protecting those under his care against the possibility of acquiring the disease should also give attention to such matters as the screening of houses, restriction of the indiscriminate visiting of the sick, and many other factors that are of importance.

In handling the individual case, in a way to prevent the disease being carried to others, there are many details that will require attention. Among these are the following, protecting the patient from flies or other insects; the sterilization of all eating and drinking vessels, or anything that comes in contact with the patient; and particular care in the sterilizing of the excreta before allowing it to go into the sewerage. Before discharging a case, it is essential that it be conclusively proven that the individual is not a "carrier." Of particular importance here is an investigation for the presence of bacilli in the urine.

Treatment. General Statement.—There is no specific treatment, and the management of the case, therefore, resolves itself into the following:

1. Those prophylactic measures that guard against the spread of the disease.

2. Infinite care and attention to the numerous details looking toward the general welfare of the patient.

3. Attention to symptoms as they arise.

It has been frequently stated that a good nurse is more important than a good doctor, and it is certainly true that while we have no specific medication, much can be done to increase the comfort of the individual and the chances of recovery.

General Management.—The first consideration is where to treat the patient—that is, in the home or in a hospital. When the case occurs in a hotel or boarding house or in the crowded business district or in a home that cannot be adapted to proper treatment, it is certainly highly desirable to move the patient to a place where proper facilities are available. The majority of cases must necessarily be treated at home. Unfortunately, in medical literature hospital management alone is usually considered. The following discussion is based on home treatment.

Treatment Quarters. As a long period of confinement to bed is always to be expected, preparations should be made accordingly. This may at times entail considerable re-arrangement and even some inconvenience. A room should be selected that will meet the several requirements, such as isolation from the rest of the household, freedom from noise or the odors from the kitchen or anything that might be disturbing. The matter of heating, ventilation, and sunlight should be given due consideration, depending to a large extent upon the season of the year. Particularly in warm weather it is a great advantage to have a screened porch as part of the treatment quarters, and a bath room should be included, if possible. The bed room should be simply furnished. It is particularly undesirable to have figured wall paper, unpleasant pictures, or anything else that might disturb the patient during the weeks of confinement. The bed should be one that is comfortable to the patient and convenient for the attendants. Where either must be sacrificed the comfort of the patient must have first consideration. A high bed that is not too wide, such as the standard hospital type, is most convenient. The mattress should be sufficiently firm, yet elastic, and generally comfortable, as the prolonged confinement to bed and possible emaciation must be considered from the beginning. It is best to protect the mattress with some soft waterproof material, such as stork-sheeting, it should never be hard and unyielding, as oilcloth or canvas. This protective material should, of course, be covered with a sheet. The clothing of the patient and the bed covering must be such as will meet the requirements for comfort of the patient and convenience in handling.

Rest. This should be both mental and physical. Business cares, domestic worries, or anything that would tend to disturb must be excluded. A bed pan should always be used, and a urinal when the patient is a man. Liquids should be taken through a bent tube. The nurse should assist the patient in turning in bed, particularly after the early period of the disease has passed.

Nursing. An indispensable factor in the management of these cases is good nursing. Where possible, trained nurses should be used and one should never try to do double duty. Where such assistance cannot be obtained, as is so often the case, responsible members of the household should be designated for the care of the patient and relieved from other duties. Under all circumstances the doctor should see personally that his orders are being carried out and that the patient is recieving the proper, detailed attention. The nurse should be isolated from the rest of the household and, under no circumstances, should those in attendance upon the case have anything to do with the preparation of food for others. If the nurses have not been recently vaccinated against typhoid, it should be done at once.

Care of the Mouth. The mouth should be cleansed carefully several times a day, preferably after each regular feeding. It is often advisable to let the patients do this for themselves, by wrapping a finger with gauze, dipping it into some pleasant mouth wash, and cleansing the teeth, tongue, cheeks and roof of the mouth. There is less tendency to nausea than if this is done by the nurse. Material between the teeth should be carefully removed. In the selection of a mouth wash, if the patient has been accustomed to some satisfactory preparation, it is better to let him continue to employ it. There is no specific value in any of these and one of the first considerations should be that it is of a pleasant character. Where a mouth wash is prescribed, Loiqur Antisepticus (N. F.) will usually meet the requirements well. An important consideration here is that the solution be acid, as this will stimulate the glands of the mouth, while an alkaline solution would tend to inhibit them and the mouth soon becomes dry.

The nails should be carefully trimmed and kept clean. In the case of women with long hair, it is usually desirable to cut it, as it may interfere with the comfort of the patient and the use of the ice bag, and will usually fall out anyway. The hair should not be cut too short as the rubbing of a short stubble against the pillow or ice bag may cause considerable discomfort.

Ice Bag. Under ordinary conditions this may be kept to the head more or less constantly when the temperature is sufficiently high or if there is headache or nervous phenomena. A common rule is to apply the ice bag to the head when the temperature reaches 102°, and to leave it on until the temperature drops to 101. It probably has some influence in reducing temperature, relieving or preventing headache, and lessening nervous phenomena. The 9 inch "English" ice bag is the most satisfactory. It should not be filled too full, and the air should be removed so that the bag can be fitted or cupped over the top of the head as in this way it can be made to furnish a fairly large area of contact. The bag should not be in direct contact with the skin as it may cause marked discomfort. Where there is much hair, it may be put directly on top of the hair, otherwise one or two thicknesses of a soft face towel may be used under the bag. It should not be heavy enough to be a source of discomfort. It is often necessary to prepare the head, and this is one of the advantages in removing long hair. The present style of bobs meets the requirements well.

Hot Water Bottle or Electric Pad. These may be used to the feet or body at any time there is chilliness or other indications for them.

Liquids by Mouth. The value of liquids is principally to dilute toxins, promote elimination, contribute to comfort, and afford a vehicle for the intake of nourishment. These things will be discussed in detail under the head of diet.

Enemas. These will be discussed particularly under the head of symptomatic treatment. They may be used for removal of gas or of fecal matter from the colon. Their value for reducing temperature is at least questionable.

Baths. Three general types are in use; the Brand, the slush, and the sponge. The concensus of opinion is distinctly in favor of the Brand bath and some even make the statement substantially that the farther we get away from it the farther we become removed from the proper application of hydrotherapy. A consideration here that must not be overlooked is that these writers advocating this measure presuppose the advantage of more trained assistance and better facilities than are usually available, in fact, very few hospitals are equipped for this type of hydrotherapy. There is no question about the advantage of this measure when it can be properly carried out but it should be borne in mind that it is not an essential part of successful treatment.

The object of the baths is to reduce temperature, stimulate nerve centers, lessen psychic phenomena, improve the circulation, maintain body cleanliness, prevent odors, keep the skin functioning, prevent trophic disturbances, and contribute to general comfort. A rule that is often employed is to bathe the patient every three hours when the temperature is over 103°, this applies no matter what type of bath is used.

The Brand Bath. The patient is prepared by giving some stimulant as coffee, brandy, or aromatic spirit of ammonia. The bath tub is brought to the side of the patient's bed, or the bed is wheeled to the side of the bath tub. The tub must be of such type as to meet the requirements of this procedure. In the case of a man, a napkin is arranged to cover the genitals. The temperature of the water is usually based on 85° for fever up to 103½, and the temperature of the water is reduced 10° for each degree of fever above 103½ —this reduction not to go below 65°. The usual duration of the bath is 15 minutes, unless there are indications to the contrary. The patient's head should be wrapped in a towel wrung out of cold water. During the process of the bath, one nurse should apply friction to the body (with the exception of the abdomen), the other nurse should support the patient's head, watch the pulse, and for any indications for terminating the process. After the bath the patient is removed to the bed, wrapped in a sheet for a few minutes, then dried and comfortably covered. In lifting the patient one nurse places one arm under the head of the patient and one under the shoulders, another nurse places one arm under the middle of the patient's body and one under the knees. The patient stiffens the body to facilitate convenient handling.

The contra-indications to the Brand bath are hemorrhage, perforation, coma, marked circulatory disturbances, or other conditions that might render the process inadvisable.

The Slush Bath. This is prepared by covering the surface of the bed with oil cloth or some waterproof material and raising the edges of this with a rolled blanket or some other device so that the patient lies in a trough. Water is then poured over the patient or applied liberally with a sponge, while friction is made to the surface of the body, of course, avoiding the abdomen. The preparation of the patient, contra-indications, and all other factors are the same as outlined in the preceding paragraphs on the Brand bath. The water may be used cold, hot, or graduated.

The Sponge Bath. This is carried out by putting some protective covering as waterproof material or a blanket under the patient and sponging the surface of the body, with or without friction. The water may be hot, cold, or graduated. The preparation of the patient and the results sought are the same as suggested under the head of the Brand bath. There are no contra-indications to the sponge bath. Of course, in the presence of hemorrhage or perforation, the other indications for treatment are so much more urgent that the necessity for hydrotherapy may be overshadowed. This type of hydrotherapy seems to meet every possible requirement. In the use of cold water, the temperature is immediately reduced by applying to the surface of the body a material that is colder than the surface. In the use of hot water, there are several factors that contribute to the reduction of temperature. One is the evaporation of the water from the surface of the body, as water passing from a liquid to a gaseous state takes up a large amount of heat and, in doing this, it naturally draws it from the most available source, which in this case is the surface with which it is in contact. This is illustrated by the process of freezing the skin by spraying with ethyl chloride, as it is the rapid passing of this from a liquid to a gaseous state that produces the effect of freezing. Another factor is the dilation of the superficial blood vessels which brings more blood to the surface, therefore radiating more heat as a natural consequence. It would seem natural to suppose that the warm bath would be more gratifying to most patients, particularly those not accustomed to cold baths, and that it would tend more, in some instances at least, to allay nervous phenomena. Clinically it seems to meet the requirements well. It is probably better not to decide arbitrarily on one type of bath for all cases, but here, as elsewhere in medicine, to individualize.

Diet.—More progress has been made here than in any other phase of the treatment of typhoid. Many plans have been used from time to time, and at present we may group these under three heads:

1. The old method of a low total caloric intake. This is the plan that has been used in past generations, the idea being that the sick patient, with diseased intestines was not in a position to handle food satisfactorily. The greatest fault, however, was in a misunderstanding as to the food values of the preparations that were used. The menu consisted of meat broths, various proprietary meat juices, meat extracts and similar preparations, tea and coffee, strained soups, and other like material. It is now known that most of these have practi-

cally no food value. Another factor of importance is that this type of diet contains so large an amount of meat extractives that it is probably injurious to the kidneys. Many years ago there was reported an experiment by one of our large institutions in which two pens of dogs were selected and one group fed upon water alone, the other upon the type of diet under discussion. The group fed upon water outlived the other. The symptoms given in some of the old text books as those of late typhoid are known now to be really those of starvation.

2. High Caloric Diet. This has been used at times for many years. It is probable that Coleman did more to place this before the medical profession than any other man and in fact, it is often referred to as the "Coleman diet." The tendency of some physicians is probably to carry this to an extreme. In one recent treatise on typhoid fever the diets average about 5,000 calories per day and some of those suggested go above 6,000 calories. It seems that here there is a failure to sufficiently consider the nutritional needs and the digestive ability of the patient.

3. Modified Diet. The plan here is to individualize and also to take into consideration the various factors that are operative. It is this type of diet only that will be discussed in the following pages.

General Considerations. The average food requirements of the average individual in health, under average conditions of rest, may be stated as about 30 calories per day per kilo of body weight. As the average man is about 70 kilos, this would place the average diet at about 2,100 calories. As there is more rapid oxidation in a febrile process, this diet would have to be increased to keep the patient in a nutritional balance, just as it would were the patient taking active exercise.

Another consideration is that where the patient is in a full state of nutrition or over-weight, it may not be a disadvantage to have a certain amount of reduction take place. The argument is often made that this patient is going to reach a stage in the disease where he will need every possible resource to pull him through. Against this it may be said that where any individual is to be subjected to any particular physical strain, as in football, or other forms of athletics, it is customary to get the best results by arbitrarily reducing the weight to certain more or less definite standards before subjecting him to the test. There is a homely old adage, "A lean dog for a long race." This should not be understood as favoring the reduction of a patient's state of nutrition below a reasonable average. For example, if a man 6 feet tall and beginning at 185 pounds weight reaches the period of lysis at the end of the third week, with a loss of 10 or 15 pounds, it should not be considered bad workmanship, and the reduction may have been an actual advantage, as the burden on the heart, kidneys, and other organs has been reduced. This is well borne out in the management of such conditions as diabetes and myocarditis. It is probable, therefore, that the average caloric requirements in typhoid fever are about 2,500 calories.

In order to repair proteid waste, a certain amount of proteins are necessary, and this has been variously estimated, with an average of about 1 Gramme per kilo of body weight per day. It should be remembered that proteid waste can be prevented to a large extent by the use of carbohydrates.

General Dietary Requirements.

1. Up to the Nutritional Needs. This would take into consideration the factors mentioned, such as the state of nutrition of the patient, the tendency to maintain or lose weight, etc.

2. Within the Digestive Ability. Any food that is not digested and assimilated is a possible source of trouble, by reason of its mechanical presence or from the formation of gas or toxic material.

3. Free from Refuse. Insoluble material passing down into the ulcerated area may be an active source of trouble.

4. Small and Frequent Feedings. In this way a sufficient amount of nutrition may be given in 24 hours with a minimum tax upon the digestive function. Another factor that must be considered here is that we are creatures of habit. For example, an individual who goes to sleep at 11 o'clock is more apt to begin a normal sleep at that time than if he retires earlier or waits to a later hour. The patient who has been accustomed to taking three meals a day at definite times is probably more apt to take food with relish, and to handle it well, if fed at those times. A satisfactory plan is to give three moderate feedings per day at the usual meal hours, and extra feedings in the middle of the forenoon, the middle of the afternoon, and two or three hours after the evening meal. Some nourishment may be given during the night, if indicated.

5. Palatable. Food should be well prepared and present sufficient variety to favor appetite. Food that is taken with relish is handled better by the digestive apparatus than food that is forced. Needless to say the material should be free from excessive condiments, should be properly cooked or prepared, and in every way rendered as digestible as possible. The meals should be daintily served, as this tends to stimulate the appetite. The tray should be supplied with the best linen, the best china, and the best silver obtainable in the household. It is also desirable not to serve too much, the word "dainty" expresses the requirements well. Instead of giving a large amount from which the patient is to select what is wished, it is better to bring only what should be eaten. Often in this way more will be taken without protest than if the patient is subjected to the discouragement of having to tackle an impossible quantity.

6. Changed to Meet Requirements. The diet will have to be changd from time to time to meet such requirements as, high temperature, gastric discomfort, loss of weight, abdominal distention, constipation and diarrhoea.

Articles of Diet. It is not the intention here to give all of the foods that may be used, but merely to make some suggestions of interest and value. Among those foods that can be used to furnish the largest part of the diet are the following:

Milk	320 calories per pint
Buttermilk	160 calories per pint
Cream	800 calories per pint
Butter	200 calories per ounce
Eggs	75 calories each
Milk sugar	120 calories per ounce
Malted milk	120 calories per ounce.
Fruit juices	Their value may be indicated by the statement that the average orange is about 100 calories.
Cereals	The value of cereals depends largely upon the way in which they are prepared. They probably average about 50 calories per tablespoonful of cooked cereal.
Bread	This averages about 75 calories per slice.

In addition to these there are many articles of food or combinations of more or less value, such as:

Potatoes. (Irish or yams) baked or boiled and mashed with milk and butter.

Soups and Broths. As pea, potato, celery, asparagus, tomato, and chicken, made with rice, barley, or some other cereal, boiled for two hours, and one-half milk or one-fourth cream added.

Gelatin served with cream.

Custard. Made with eggs, milk and cream has a very high food value.

Meat juices. The fresh juice from roast or broiled meat has very little food value, but increases the palatability of cereals.

Tea and Coffee. These have little food value, but serve as vehicles for the administration of milk sugar, and cream.

Various schemes can be used for increasing the palatability of the food or its caloric value. For example, the fruit juices may be sweetened with milk sugar and the white of an egg added. As milk sugar is only about one-fifth as sweet as cane sugar, a fairly large amount may be given in the various foods and drinks. Cream may be added to the tea, coffee, soups, broths, mashed vegetables, cereals and custards, or it may be added to the buttermilk. Butter may be taken with bread, which should preferably be toasted, and it may also be added to cereals and mashed vegetables. Some advocate allowing the patient to chew sugar cane and swallow the juice, as this not only increases the fluid intake but helps to keep the mouth clean.

Many give a diet consisting largely of cow's milk, while others find it unsatisfactory. The present tendency is against the use of plain milk, particularly in the presence of high temperature or abdominal distention.

A sample diet, with caloric values, may be indicated in the following suggestion:

Breakfast:		
1 soft boiled egg	75 calories	
2 tablespoonfuls of cereal	100 calories	
1 slice toast	75 calories	
¼ ounce butter	50 calories	
1 cup coffee (with cream and milk sugar)	100 calories	400
10:00 A.M.		
1 cup custard	200 calories	200
Lunch:		
6 ounces cream soup	150 calories	
1 slice toast	75 calories	
1 tablespoonful cereal	50 calories	
¼ ounce butter	50 calories	
2 tablespoonsful mashed potatoes or carrots (with milk and butter)	100 calories	425
3:00 P.M.		
1 cup custard or gelatin (with cream and a cracker)	200 calories	200
Dinner:		
Cream soup or broth	150 calories	
1 tablespoonful cereal with meat juice	50 calories	
1 slice bread	75 calories	
¼ ounce butter	50 calories	
Gelatine with cream	100 calories	425
9:30 P.M.		
Malted milk (with water)	75 calories	
Toast with butter	100 calories	175

To this is added the fruit juices, sweetened with milk sugar, that is taken throughout the 24 hours.

Fruit juices (with milk sugar)	500 calories	500
	Total	2325

There is little difficulty in giving these patients sufficient food, unless there are objections in the way, such as anorexia, indigestion, or diarrhea.

General Medication.—There is no specific treatment, though many drugs in the past have been used and backed by elaborate claims and interesting statistics. Among these might be mentioned calcium sulphide, copper arsenite, phenyl salicylate, hexamethylenamine, emetine, oil of turpentine, guaiacol carbonate and Woodbridge tablets (calomel, menthol, etc.). The attitude of the profession today is that these have no value except as they may be employed in the symptomatic management.

Symptomatic Treatment. Headache. The measures of general care previously outlined will usually do much towards preventing headache, particularly the use of the ice bag to the head, baths, careful diet and proper elimination. Where these do not meet the requirements, codeine may be given in sufficient amounts. This is to be used only to meet definite indications and discontinued when this symptom is under control.

Insomnia, Restlessness, Etc. When the case is properly handled from the standpoint of general care these symptoms are not often of a troublesome nature. If they develop, particular attention should be given to hydrotherapy, fresh air, quiet, and the various other measures that might be of benefit. It is at times necessary to resort to such agents as codeine, bromides, or barbital. Codeine is to be preferred in most cases.

Fever. Antipyretic drugs should never be employed. The ice bag to the head, and some one of the various types of baths, together with quiet, rest, fresh air, careful diet and intestinal elimination, usually meets the requirements. In this disease especially the reduction of temperature by the use of antipyretics is not worth the price.

Abdominal Distention. There are several factors operative here, one is the toxemia of the disease producing a partial intestinal paralysis and reducing the ability of the muscles of the alimentary tract to function. Another factor is the food. No matter what the condition, gases, if formed, must be from the intestinal contents, therefore, the keynote of the prevention of distention is care in diet.

It should be remembered also that an important source of trouble is refuse material that has not been properly eliminated. An excellent plan is to give as a routine treatment from the beginning to the end of the disease ½ to 1 fluidounce (15 to 30 cc.) of liquid petrolatum each night, unless it is contra-indicated by diarrhea. Castor oil is used in the mornings if needed, when needed, and as needed. Usually about ½ fluidounce (15 cc.) is given. Many cases will never require the castor oil, others may require a dose every two or three days. It has been argued that a laxative by increasing peristalsis increases the tendency to hemorrhage or perforation; it is probable that distention is much more dangerous from this standpoint than mildly increased peristalsis. When distention occurs in spite of these measures, enemas should be used with sufficient frequency to meet the requirements. Probably the most satisfactory is prepared by using ½ fluidounce (15 cc.) of tincture of asafetida to ½ gallon (2000 cc.) of warm water. Irritant mixtures are usually best avoided. The colon tube may at times be employed to advantage. Many advise hot applications to the abdomen.

Abdominal Pain. The measures discussed in the preceding paragraphs on flatulence apply here also. At times local applications, such as hot compresses or the ice bag, may be employed for temporary relief. Codeine may be given when necessary.

Diarrhea. This may usually be controlled by proper attention to diet. Of principal importance is prophylaxis by careful dietetic management from the beginning of the case. Should this condition develop, the diet should immediately be investigated for possible sources of trouble, and all laxative foods should be omitted and fats reduced or temporarily withdrawn. Sometimes a purgative dose of castor oil, by eliminating the offending material, may give complete relief. Bismuth subnitrate in 30 grain (2 Gm.) doses may give excellent results. More active medication, as paregoric, may sometimes be required, but should be used only when indicated by symptoms of sufficient persistance or severity. A colon irrigation of warm cooked starch water will often meet the requirements well. Small amounts of ginger-ale may be added to the diet.

Constipation. The routine plan of administering liquid petrolatum at night and castor oil in the mornings, as needed, will usually prevent the development of constipation. Should the condition arise in spite of these measures, the liquid petrolatum may be increased or olive oil added.

Many excellent clinicians do not hesitate to use a calomel purgative during the course of typhoid, but so heroic a measure is probably fraught with an element of danger.

Convalescence.—The duration of confinement to bed after the temperature has become normal will depend to a large extent upon the condition of the individual patient. It is probable that two weeks of normal temperature should be considered as a minimum. After this the patient may be gradually brought into a stage of activity. As soon as convalescence begins, the diet is increased, depending upon the state of nutrition and the demonstrated ability to handle food. Under no circumstances is there a need for dietary extravagance. Tonics, if given at all, should be employed late, as it is undesirable to give an artificial appetite and feeling of strength as these may lead to indiscretions. Patients should not be discharged until laboratory investigation has demonstrated that they are entirely free from the organisms.

Complications.—The possible complications in this disease are many and their management about the same as would obtain should the same condition arise from other causes. Here we shall discuss only those most commonly encountered.

Bed Sores. It is very rare indeed that these will develop if the patient has the benefit of the measures of general care as outlined in the preceding discussion. This refers particularly to the proper type of bed, bath, and direct attention to the skin. A prophylactic measure of considerable importance is seeing that the patient does not lie too much in one position. Another is keeping up the nutrition at least to the point of avoiding emaciation. It is of great advantage to discover damage of this character at the earliest possible moment, and trophic changes usually may be recognized long before actual sores develop. Should the lesions be found, the principal measure for relief is to avoid further pressure contact. This may be done by anyone of the various devices on the market, such as rubber or air mattresses or cushions or by having the patient lie so as to avoid pressure upon the point affected. The lesions may be treated by properly cleaning and dusting with some simple powder, such as zinc stearate. There is no specific.

Hemorrhage. Some loss of blood is said to occur in over 50 per cent of the cases. It usually develops during the second or third week, though it may be earlier or later. Of particular importance is an early diagnosis of the condition and evidences should be watched for and given due consideration if they develop. The first symptom is often an unusual sense of faintness or prostration with paleness of the face and particularly of the mucous membranes of the mouth and conjunctiva. The skin becomes cool and moist and there may be considerable perspiration. The pulse rate increases and the temperature falls; there may be nausea, or actual emesis; there may or may not be pain. There is usually a prompt and marked fall in blood pressure. A blood examination will show anemia if there has been much loss of blood. The feces will later give conclusive evidence, though the diagnosis should usually be made before this is obtainable.

The prophylaxis includes all those measures looking toward the proper management of the case.

Treatment consists in absolute mental and physical rest. If possible the patient should not be allowed even to speak. An ice bag of sufficient size should be placed to the abdomen and morphine given by hypodermic. Many use morphine and atropine. It is not usually advisable to give more than one dose. All food should be withheld, the patient not even taking water by mouth until such time has elapsed as would indicate that the bleeding has probably ceased. Feeding may then be resumed by the use of liquids, 1 or 2 fluidrachms (4 to 8 cc.) every fifteen or twenty minutes. This may be gradually increased. After two or three days the condition of the patient usually justifies a careful resumption of more substantial food. Calcium is usually administered in the hope that it may be of benefit. The chloride is given intravenously or the lactate by mouth. Other agents are often tried such as horse serum, fibrogen, thromboplastin and stypticin. Blood transfusion may at times be necessary and is the one great remedial measure.

Perforation. This occurs in probably about two to four per cent of the cases. It is usually a late complication. It may be preceded by hemorrhage and is rather apt to occur in those cases with a hemorrhagic tendency. There may be prodromal symptoms, such as a tendency to abdominal pain and emesis. The onset of symptoms is usually rather sudden, characterized by pain which is particularly referred, as a rule, to the right lower quadrant. There is usually tenderness, abdominal rigidity, emesis, rapid pulse, and all of the other evidences of shock. Later there are the findings of peritonitis, such as abdominal distention and tenderness, elevation of temperature, rapid pulse, rapid respiration of the thoracic type, with a tendency to delirium and coma. At this time there is also a rise in the total white and differential counts.

Prophylaxis. This would include all the measures mentioned under hemorrhage.

Treatment. This is entirely surgical.

LEPROSY

General Statement. Definition.—Leprosy is a chronic specific disease characterized usually by slow development and more or less distinctive changes. Several types of this disease have been recognized, among which the most common are:

First. Nodular (or tubercular) leprosy.

Second. Neural (or anesthetic) leprosy.

Incidence.—No people seem to be immune; while it is more prevalent among some groups than others, this may be due to factors other than actual immunity. It is rather rare in early childhood and late life, though it may occur at any age. It is more common among men than women. It is more prevalent in warm climates. Probably the largest percentage among any people occurs in India. The number of cases in that country is estimated at from 150,000 to 1,000,000. It is also rather prevalent in China, in the South Sea Islands, and in certain sections of Latin America, particularly Colombia.

Etiology.—The mode of transmission of the disease is still undertermined; many theories have been advanced but lack substantiation. Among them the most commonly accepted is that of transmission through the bedbug. Many observers contend that it is not transmitted by direct contact. The actual causative organism is the Bacillus lepræ of Hansen.

Course and Prognosis.—The incubation period may vary through a fairly wide range, though actual data are hard to obtain. The average is probably about two years. The course of the disease averages about eight to ten years; it is usually fatal, though modern methods of handling give a more favorable outlook than was justified in the past. Many of the patients die of intercurrent diseases, such as pneumonia or tuberculosis.

Symptoms and Diagnosis. History. In establishing a diagnosis of a suspicious case, the history of the appearance of symptoms and the history of exposure, particularly of the individual having resided in a section of the country where the disease is endemic, are matters of importance.

Onset. This at times may be comparatively sudden, though as a rule the development is slow. In many cases the first noted symptom is the eruption. A careful observation will reveal in a fairly large percentage of cases other pathological manifestations, the most common being a huskiness of the voice and an involvement of the mucous membrane of the nose. There are often malaise, anorexia, nervousness, insomnia and mental disturbances.

Fever. There is a tendency to fever with more or less marked periods of intermission throughout the course of the disease. Some observers have described various types of fever, but hyperpyrexia is neither an outstanding nor distinctive symptom.

Local Lesions (Nodular Leprosy). The first evidences are usually more or less transient blotches, ranging in color from fawn to bronze. Sooner or later nodules develop, particularly on the exposed parts of the body such as the face, hands and feet. There may be a rather general nodular eruption somewhat resembling the papular stage of smallpox. As a rule these nodules vary in size and as they become larger tend to accentuate the wrinkles of the skin, this process giving rise to a "leonine" appearance of the face. Some of these nodules may disappear; others may undergo ulceration, the ulcers being sharply defined with indurated borders somewhat resembling those of syphilis. When these extend deep they may be highly destructive, the process destroying not only the soft structures but even the bones.

Local Lesions (Nerve Leprosy). Here also there may be the preliminary maculæ varying in size, but the characteristic feature is the development of enlargements on certain nerve trunks. These may be either spindle-shaped, spheroid, or bead-like in character. The nerve most commonly involved is the ulnar, the median nerve is next in frequency. In this type particularly there is interference with the sensory functions, especially of pain, heat, and cold. Although there may be areas of anesthesia, there is often considerable pain that is neuralgic in character. In this type, also, there is a greater tendency to the involvement of muscle groups leading to contractures. The ulceration may be marked, and result in extensive mutilation.

A fair state of general health may be maintained for a considerable time during the progress of either type of the disease, and the mind may remain clear and active.

Laboratory. There is nothing of diagnostic import in the laboratory examination except the demonstration of the Bacillus lepræ. These may sometimes be found in the nasal discharges, but are more commonly demonstrated from the local lesions.

Differential Diagnosis.—The most common conditions from which leprosy must be differentiated are psoriasis, syphilis, tuberculosis, and syringomyelia.

Psoriasis may be confused at times, but the absence of the other evidences, particularly the absence of the acid-fast organism in the local lesions should make the differentiation here comparatively easy.

The local lesions of syphilis may present diagnostic difficulties. Here the history—the course of the process and absence of the spindle-shaped or bead-like nerve lesions and the difference in the laboratory findings tend to establish a prompt diagnosis.

In syringomyelia the absence of the characteristic skin conditions as usually found in leprosy should be sufficient to establish a diagnosis. Of course, the laboratory findings are an invaluable aid.

Prophylaxis.—So little is known about the mode of transmission of leprosy and the manifestations are so horrible in character that there is no doubt the leper should be isolated. When possible they should be treated in leprosaria. On the other hand, in many cities of the United States no restrictions are put upon the activities of these people, yet during the course of generations no cases appear to have developed from contact with those affected. Not only should the case be isolated, but bedding, clothing, etc., should be destroyed.

Treatment.—The treatment of leprosy is far from being established on a satisfactory basis, though it is certain there is today a larger percentage of apparent cures than at any other time in medical history.

General Care.—No better plan of management than that laid down for the treatment for tuberculosis has been found; that is, fresh air, rest, and abundant wholesome nourishment. The general improvement in these patients is said to be remarkable when this routine is adopted. They should be made as comfortable as possible, and given not only physical rest but mental diversion. The general care should include proper attention to bathing, dental hygiene, intestinal elimination, the drinking of sufficient water, comfortable sleeping quarters and anything else that would contribute to the welfare of a sick person.

Specific Treatment.—Many drugs have been used from time to time, but the main reliance today is placed on chaulmoogra oil. The usual rule is to begin with about 5 mimins (0.3 cc.) thrice daily, gradually increasing the dose until the patient receives 1 fluidounce (30 cc.) per day. Given by mouth it has a tendency to cause gastric disturbances such as anorexia, nausea, and vomiting. Given by needle it may cause considerable local discomfort, sometimes even abscesses. Many derivatives of chaulmoogra oil are being used, among these the most common being the official Ethyl Chaulmoograte. The average dose is 15 minims (1 cc.) This is given principally by hypodermic injection. No instructions will be given as to the use of those remedies, as their employment in general medicine is so infrequent that anyone undertaking the treatment of leprosy should have recourse to the more extensive treatises of current literature.

Other drugs have been recommended, including arsphenamine, but their value is very uncertain. Serums and vaccines have been employed and have their advocates.

Local Measures.—In the treatment of the local lesions various remedies have been recommended. Among these are solutions of such agents as potassium permanganate, corrosive mercuric chloride, and ointments of bismuth subnitrate, zinc oxide or ichthyol. The main considerations in the management of ulcerated areas are cleanliness and protection.

Symptomatic Treatment.—Various symptoms, such as insomnia, restlessness, and pain, may be managed as are the same conditions arising from other causes.

Surgery.—Much can often be done for relief of these cases by proper operative intervention. A discussion of this belongs to the realm of surgery.

Complications.—This includes such conditions as involvement of the eye or of the larynx, and may call for surgical interference.

Syphilis and tuberculosis are often associated with leprosy. Many claim a direct relation existing between these diseases. In the event of the presence of either of these, the treatment of the patient would be modified so as to meet the existing requirements.

DISEASES OF THE JOINTS

There are few diseases about which there is as much difference of opinion in the matter of nomenclature and classification, as those involving the joints. Not only this, but it is often rather difficult from a clinical standpoint to differentiate those conditions which involve only soft structures from those in which the cartilage and bone participate; in fact, in many instances these various types may be regarded as different stages of the same disease process.

There are some specific, obscure or unusual joint diseases that will not be included here, but the discussion limited to the following:

First. Rheumatic Fever.

That condition which, in all probability is due to a definite organism, and for which the salicylates are practically specific.

Second. Infectious Arthritis.

This might better be called secondary infection arthritis. This group includes those conditions that are the direct result of an infectious process elsewhere in the body.

Third. Osteoarthritis.

Also known as arthritis deformans (atrophic and hypertrophic).

Fourth. Synovitis.

An inflammatory process affecting the synovial membrane and often related parts, but in which there is no involvement of the hard structures.

Gonorrheal and tubercular arthritis are omitted. The first of these belongs essentially to the genito-urinary diseases, which are not included in this volume. The second comes under the head of surgical tuberculosis.

ACUTE RHEUMATIC FEVER

General Statement. Definition.—This is an acute, infectious disease characterized by fever and other general manifestations, and by a tendency to the involvement of various joints with a subsequent return to normal. Much confusion exists relative to the nomenclature of this condition; may have discarded entirely the word rheumatism, and speak of the condition as acute arthritis.

Rheumatic fever in its local manifestations shows a predilection for certain joints. In the order of their frequency of involvement they are,—the ankles, knees, shoulders, and hips. Various other joints may be affected; more than one is often involved at the same time. The tendency is for the condition to be migratory; as one joint is showing improvement, another may begin to give evidence of trouble.

Incidence.—While this is classed as an infectious disease, and epidemics have been reported, they are at least exceedingly rare. The majority of cases develop between the tenth and fortieth years of life; in fact, over one-half between the fifteenth and thirtieth years. Young infants seem to be practically immune, and old age relatively so. Males are more susceptible than females, probably because of their activities. Those who follow occupations that keep them in the open and subject them to much exposure are more prone to the infection. In fact, the incidence of rheumatic fever runs a close parallel to the incidence of tonsillitis.

Etiology.—There is still considerable difference of opinion as to the actual causative organism, and it is probable that the last word has not yet been said. Poynton and Payne, who have made exhaustive researches along these lines, have advanced much evidence in favor of the micrococcus rheumaticus being the etiological factor. Whatever the causative organism, the tonsils seem to play a distinct part; this is proven by such evidence, for example as the consistency with which the disease is preceded by inflammation of these glands and the relative immunity of those who have had an early tonsillectomy.

Course and Prognosis.—The disease, as such, usually runs an acute, stormy course, but the disability may be indefinitely prolonged in complicated cases, particularly when there is involvement of the heart. The usual course is for any joint not to be involved more than a few days and then to improve gradually to the point of complete recovery.

In giving the prognosis, all of the factors should be borne in mind, such as the tendency to successive involvement of different joints, heart complications, anemia, and exhaustion.

This condition is important from three standpoints: First, the discomfort entailed. Second, the prolonged disability that often results. Third, the involvement of the heart which may lead to permanent impairment or even death.

Symptoms and Diagnosis.—In the typical cases the evidences are sooner or later of so definite a character that there is seldom much difficulty in making a diagnosis. The trouble arises in atypical cases or in those which present some coexistent condition which may be confusing.

History. In effecting an early diagnosis, this is of paramount importance; especially, the history of previous attacks, of preceding tonsillitis or of injuries or urethritis.

Onset. This is usually abrupt, though there may be a gradually increasing disability extending through several days. In the majority of cases, within a few hours after the first definite symptom of this disease, the patient is experiencing a fairly well developed case that is unmistakable.

Chill. The onset is often ushered in by a distinct chill; or there may be a prolonged sense of chilliness, or repeated chills coming on at more or less irregular intervals. During the course of the disease, as new joints are involved, there may be a repetition of this.

Fever. There is usually considerable elevation of temperature, lasting for a varying period of days and usually reaching from 102 to 104, though it may go even higher. There is a tendency to exacerbation of temperature with local involvement of new areas.

Sweats. There is a pronounced tendency to periods of excessive sweating; that is sometimes a source of much inconvenience to the patient.

Pulse. There is an increase in pulse rate, often out of proportion to the other manifestations of the disease. An excessive rate or the development of irregularity should lead one to suspect involvement of the heart.

Gastric Symptoms. During the acute stage, there is usually an almost complete disinclination to take food. Nausea is a frequent symptom and at times there may be considerable gastric disturbance. It is highly possible, however, that to a large extent these symptoms that have been credited to the disease are in reality due to the treatment.

General Discomfort. In addition to the local pain in the involved joints, there is, as a rule, severe headache, particularly during the early stages of the disease. There is a tendency to general discomfort, probably more than is found in the majority of acute febrile disorders.

Local Symptoms. The characteristic manifestation of the disease is the involvement of the joints. As has been previously stated, there is a predilection to certain particular ones, as the ankle, knee, wrist, and elbow. More than one is often involved at a time and there is a tendency for the condition to pass from one to another. Certain muscles and fibrous structures, independent of joint relation apparently may be the site of local involvement, though as to whether or not this is the case in true rheumatic fever is still a matter of dispute. The joints are swollen, usually reddened and intensely painful. The swelling may involve much of the surrounding structures. There is pitting on pressure. The discomfort is more pronounced on active than on passive motion, and may be so marked that even the jar of someone's walking across the floor will cause pain.

Laboratory Examination. There is an increase in the total white and the polymorphonuclear counts. The urine usually shows some albumin and casts.

Differential Diagnosis.—The main conditions from which rheumatic fever must be differentiated are gonorrheal arthritis, secondary infectious arthritis, gout, and diseases of the bone, such as osteomyelitis. Making this differentiation is more a matter of care than of particular skill, as these conditions usually present differences both in the history and the general and local symptoms that sooner or later makes a diagnosis comparatively certain.

Prophylaxis.—As the disease apparently carries an element of infectiousness, the case should be isolated, separate eating and drinking vessels should be used, and, in fact, such other measures as would be indicated in acute sore throat.

In my opinion, one of the most certain indications relative to the etiology of the disease is the relation it bears to involvement of the tonsils, and much can probably be done by giving these glands proper attention. When there is a tendency to repeated attacks of rheumatic fever, the tonsils should be removed; this should be done in an interval between attacks. To remove them during the attack will not materially benefit the process that is already under way, and will increase the danger of the surgical measure. The idea is to prevent the subsequent entry of infection through this portal. Another factor in prophylaxis that may be of some importance is the routine employment of salicylates in the treatment of acute tonsil infections. This has seemed to be of benefit and is certainly worthy of further consideration.

Treatment.—This is influenced by several considerations: the general comfort of the patient; discovering and removing the cause; local measures directed particularly to the relief of pain; the prevention of complications; the repair of damage done, and the prevention of further attacks.

General Care.—Absolute rest in bed is essential. There are several reasons for this, one of which is to promote the comfort of the patient; another is to lessen the danger of damage due to motion of the involved joints; and another one of major importance is to prevent heart damage The percentage of heart involvement is so large, that it must be considered as a possibility always. The rest should extend through the entire period of acute manifestations and well into convalescence. Should there be heart involvement, this, of course, would require all of the additional care as called for by a similar condition from other causes.

Treatment Quarters. These should be selected with the idea in view of the comfort and well-being of the patient and the convenience of those in attendance. In cool weather it is highly desirable to have a room that can be properly heated; in hot weather, ventilation is of more importance. It is desirable to have a sun-porch in such relation to the patient's room that he can be given conveniently the benefit of fresh air and sunshine, and at the same time have the opportunity of being removed to proper protective quarters at night or during unfavorable weather. This is of particular advantage during convalescence. Here, as in all cases of sickness, the accessibility of the bathroom, the freedom from noises from the outside and from disturbance from the household should be considered.

Bed. This should be selected mainly from the viewpoint of the comfort of the patient. The mattress should be sufficiently firm, yet of such elasticity that the patient can rest with a maximum of comfort. This is a disease in which there may be long periods during which the least movement on the part of the patient will cause much suffering, and there may be many days during which the victim will rest continuously on his back. Where possible the bed should also be of such a type as to permit of the convenient handling of the patient by those in attendance. In the majority of cases where the patient is treated in a home, it is desirable, as in almost all other cases, to let the patient use the bed to which he has been accustomed, if it is satisfactory.

Covering and Clothing. The patient must be warmly clothed in cold weather; probably the best term to use is "comfortably warm," that is to have the covering a little more than the individual would select if left entirely to his own devices, and yet not sufficiently warm to cause discomfort. In cold weather woolen garments are desirable and it has been a custom for many years to place the patient between blankets in cold weather.

Nursing. Expert attendance is highly desirable. A properly trained nurse can do the necessary handling of these cases with only a small fraction of the discomfort that would result from the efforts of the average unskilled attendant. It should be remembered that this is a serious condition, at least one with decidedly serious possibilities, and every effort should be made to give the patient the benefit of skilled attention and trained observation.

Bathing. The regular daily cleansing bath should be given; this, of course, should take the form of a warm sponge. It should be carried out with the least possible movement of the patient. During the period when there is a tendency to sweating, the bath may be followed with an alcohol or witch hazel rub. The latter is preferable. The use of water for the reduction of temperature will be discussed later.

Care of the Mouth. This should receive careful attention, even more so than in the case of most other febrile diseases. Not only should the teeth and other structures be cleaned, but it is desirable to employ as a routine measure some spray or gargle for the throat. Patients may use their favorite mouth wash, if they are accustomed to one, as the proprietary preparations are pleasant to use and about as efficacious as anything we could suggest. The liquor antisepticus of the National Formulary is excellent.

Bowels. Careful elimination should be maintained without violent purgation. There are fewer things more distressing to the patient than the disturbance incident to intestinal evacuation when every movement is effected at the price of suffering. A history can usually be obtained as to what preparation and what dose will meet the requirements best.

Diet.—During the time of high temperature, there is little necessity for a large caloric intake. As soon as the stormy period has passed, the diet should be rapidly increased and every effort be made to maintain a favorable state of nutrition. If sodium bicarbonate is being used, care will have to be exercised in the administration of fruit juices. During the period of high temperature, a diet somewhat as follows may be given: Water, carbonated waters, other carbonated drinks as ginger ale, root beer, etc., tea and coffee and similar beverages, malted milk and similar preparations, strained soups and broths (made with some cereal and ½ milk or ¼ cream added), and buttermilk. As soon as the temperature subsides, milk may be given freely and such articles of diet as cereals, bread and butter. Should the febrile period be protracted, effort must be made to increase the diet, very much as in a case of typhoid. As convalescence is well established, the food may be increased by the addition of such articles as gelatin, custard, soft eggs, white meat of poultry and soft vegetables. The old idea of prohibiting proteins has been discarded as unnecessary and inadvisable. When sodium bicarbonate is not being administered, fruit juices should be given freely.

Specific Treatment.—In acute rheumatic fever the salicylates constitute what might be called a specific treatment. They have been used in various forms for generations, and it is possible that in many of those cases where unsatisfactory results have been reported, that the trouble has been due to the fact that the disease was some other form of arthritis and not acute rheumatic fever. The salicylates have the threefold advantage of lessening pain, promoting cure, and preventing complications. There are some disadvantages, most of which will be discussed under the head of particular preparations.

Salicylism. The toxic manifestations of this group of drugs may be classed principally under three heads: The cerebral, the gastro-intestinal, and the cutaneous manifestations. The cerebral evidences are principally headache, dizziness and ringing in the ears. There is not usually a definite headache as much as a sense of discomfort that is often described as a feeling that the head is full, over-large and unsteady on the shoulders; the condition is very much akin to that produced by quinine. The ringing in the ears and the tendency to impaired hearing is usually much less pronounced than that produced by quinine, but has very much the same characteristics.

The gastro-intestinal symptoms take the form principally of anorexia and nausea. There may be frequent and persistent emesis. The loss of appetite has a tendency to be rather complete and persistent. It is highly probable that much of this is due to two factors, one of these is the sweet nauseous taste of sodium salicylate, which is the drug most extensively employed. Many prescribers try to overcome the disagreeable taste by giving in syrup, but this only increases the tendency to trouble. The other cause of inconvenience is the gastric irritation resulting from the liberation of salicylic acid in the stomach. Salicylic acid is a distinct irritant and is extensively used for this purpose as an external application. When sodium salicylate is given without neutralization of the gastric acid the following reaction takes place:

Sodium salicylate + hydrochloric acid = sodium chloride + salicylic acid. If acetylsalicylic acid is used with an alkali, as is often done, there is a splitting up of the drug with the liberation of salicylic acid; in other words, the salicylate of sodium is split up in an acid medium, and acetylsalicylic acid is split up in an alkaline medium. In either case irritation may result through the direct action on the gastric mucosa of the liberated salicylic acid. There is, of course, probably some stomach disturbance as a result of the disease process that may be the cause of or a contributing factor to the nausea.

Albuminaturia may develop from the use of salicylates and a patient taking any one of this group of drugs should have frequent urinalyses.

Sodium Salicylate. This is by far the most commonly used of any of the salicylates for the full salicylic radical effect. There are two types of salicylates on the market,—one is the "true" made from oil of wintergreen; the other is the synthetic, which is a coal tar derivative.

A Commission of the American Medical Association after investigating the relative value of the two preparations reported them as identical; on the other hand, it does seem to many of us that the preparation made from oil of wintergreen is less apt to cause unpleasant symptoms than is the synthetic product. It is certain, however, that the difference, if there be any, is slight. This drug is a white or nearly white powder having a sweetish taste; it is freely soluble in water and fairly soluble in alcohol. It is easily decomposed by acids, liberating salicylic acid. The dose as stated in the Pharmacopeia is fifteen grains. The investigators in the interest of the A. M. A. gave the safe dosage at about one hundred and fifty grains per day. This amount is often considerably exceeded. In the use of a drug of this character, the effect is produced by getting a certain concentration in the body fluids and it would seem well, therefore, to bear in mind the necessity for proportioning these doses somewhat according to body weight. While no definitely fixed rule can be laid down to apply in all cases, it is desirable to have some scheme of average dosage, to be adjusted to meet particular cases. A good rule is to give a daily dosage of about one grain of sodium salicylate for each pound of body weight. This is continued until the condition has sufficiently improved, when the amount is gradually reduced. It is seldom advisable to employ so large a dosage for longer than four or five days. There are certain precautions that must be observed, one of which is a frequent investigation of the urine as in many cases there is a marked tendency to albuminuria. Also in the event of some of the other forms of trouble developing, such as persistent vomiting, it might be necessary to alter the medication. After the period of intensive treatment, a total daily dosage of fifty or sixty grains may be continued for quite several weeks with comparative impunity.

Method of Administration. In the beginning of treatment the drug may be ordered somewhat as follows:

℞		or
Sodii Salicylatis,	℥j	30 0
Sodii Bicarbonatis,	℥j	30|0

M. fr. cht. no. xxiv
Sig.—One every three hours when awake.

Most patients can take this with comparative comfort. Where the dose becomes nauseous, the drug may often be administered to advantage by giving it in a small amount of seltzer, vichy, ginger ale ("dry") or some other carbonated drink. The sodium bicarbonate is used for two particular purposes,—one is as an alkalinizing agent, as the administration of an alkali seems to favorably influence the course of the disease; the other is to neutralize the hydrochloric acid in the stomach, so as to lessen the tendency to the precipitation of salicylic acid. During the time that this treatment is being used, it is certainly inadvisable to give fruit juices or any other form of acid near the medication, as they will tend to neutralize the sodium bicarbonate, and thereby favor the liberation of salicylic acid. Aside from this particular feature the fruit juices would not be contra-indicated. When the symptoms are somewhat under control and less frequent doses are being given, it is sometimes advisable to concentrate the medication in the late afternoon and evening. The advantage of this is that when the unpleasant symptoms develop during the sleep time of the patient, they often are not of sufficient intensity to interfere with rest, and the patient is not, therefore, inconvenienced. For example, if the patient is accustomed to go to sleep at about ten o'clock, the medicine might be given at four, six, eight and ten. During the early part of the day nutrition may be maintained, fruit juices administered, and the patient be fairly comfortable from the gastric standpoint.

Acetylsalicylic Acid (Aspirin). This drug is still rather generally prescribed by the profession under its old patent name. Since it is being so extensively advertised to the laity, it would certainly seem desirable for the profession to prescribe it under its proper title. There are, of course, many other reasons why this should be done.

It is a white or nearly white powder having a slightly acrid taste, but not particularly disagreeable to most persons. It is very slightly soluble in water, and therefore, is not to be prescribed as an aqueous solution. Its comparative freedom from unpleasant taste makes it convenient to administer in powders, tablets or capsules. It is apparently not split up in the acid secretions of the stomach, therefore, if the stomach is kept acid, there is very little tendency to gastric irritation. It should never be prescribed with an alkali. Aside from its antirheumatic properties, it is markedly antipyretic and has a high value as an anodyne for certain types of pain. Its toxicity is comparatively low. The principal danger from the use of this drug is the enormous extent to which the laity is being educated to employ it in self-medication. It is probable that the many cases of gastric irritation and even gastric hemorrhage that have been reported from the use of this drug were occasioned by administering it with alkalies.

The A. M. A. commission to investigate the dosage of salicylates gave the safe amount of this drug as one hundred and twenty grains per day. Most of us are rather disinclined to use it to this extent. The side effects are rather too pronounced for its general use for saturating a patient with the salicylic radical, and my plan in the treatment of rheumatic fever is to employ it only to that extent which seems to be necessary for the relief of pain. It may be given when using sodium salicylate and bicarbonate by alternating them about every four hours, that is sodium salicylate with sodium bicarbonate in twenty or thirty grain doses, four hours later acetylsalicylic acid with some fruit juices, four hours later the sodium salt, etc. When the pain has been sufficiently relieved, it is better to continue the specific treatment with sodium salicylate.

Other Salicylates. Various other salts such as those of ammonium, potassium, and strontium, have been used, but they do not seem to possess any advantage over the sodium product, and most of them have some disadvantages.

Phenyl salicylate has been rather extensively used, but does not have any advantage in rheumatic fever over the salicylates first discussed. It certainly has many disadvantages, particularly the liberation of the phenol radical which might be dangerous if the drug were employed in sufficient amount to give the proper saturation of the salicylic acid radical.

Methyl salicylate has been used either as the true oil of wintergreen or as the synthetic product. For internal use there are no points in its favor, and it has the disadvantage of having a disagreeable taste and of being rather irritating.

Symptomatic Treatment.—While an effort is being made to effect a cure by the use of salicylates much may often be done for the relief of the symptoms. This is always an important consideration, particularly in a disease like the one under discussion, that entails so much suffering.

Pain. In addition to the use of acetylsalicylic acid, codeine is often used. This may be given in ¼ or ½ grain (0.015 or 0.03 Gm.) doses, repeated with sufficient frequency to give the patient the desired relief. It is seldom necessary to use any other anodyne.

Nervous Phenomena. The acetylsalicylic acid or this together with the codeine will usually meet the requirements. Where other medication is necessary the bromides in twenty or thirty grain doses may be administered along with the other treatment without inconvenience. Sometimes barbital in 5 grain (0.3 Gm.) doses may be used to promote quiet and sleep.

Fever. The high temperature may be sufficiently relieved usually by the general care of the patient, as previously outlined, and by the use of the salicylates. Where the temperature is very high, acetylsalicylic acid may be employed to advantage as a part of the specific treatment. An ice bag to the head will contribute to the relief of headache, restlessness and high temperature. Sponge baths also will do much toward relieving the fever, as well as the nervous phenomena.

Gastric Symptoms. The relief of these have been fairly well discussed under the head of the administration of salicylates. Perfect quiet and rest, an ice bag to the head, careful diet, and other general measures are of benefit in preventing or relieving this trouble. Small and frequently repeated amounts of carbonated drinks are useful.

The bromides in 30 grain (2 Gm.) doses should always be tried when these other measures fail. It should be remembered that much of the gastric trouble is the result of administering sodium salicylate with insufficient alkalies; or acetylsalicylic acid with alkalies.

Local Measures.—As the principal manifestations of this disease are in the joints and most of the pain is in these areas, it naturally results that much can be done by various local measures, at least toward keeping the patient more comfortable.

Fixation. One of the first essentials is to prevent motion of the joints. The patient naturally makes every effort to keep from moving due to the resultant pain; nature also tries to immobilize the joints by producing a state of rigidity. These processes can be aided by such measures as the use of soft feather bolsters, or padding, or even by the employment of splints. Efforts should be made to immobilize the limb in the position of greatest comfort; usually this is a semiflexion. It is not often found necessary in acute rheumatic fever to resort to splints, though a certain amount of protection is always used. A feather pillow or bolster properly arranged with the joint protected by sufficient bandages, usually meets all the requirements.

Counterirritants. Painting the area with tincture of iodine (or iodine and aconite), the application of chloroform liniment or other rubefacient solutions and mustard poultices are commonly used. These or other measures may be tried out, their continuence directed to a certain extent by the expressions of the patient as to whether or not they seem to give relief. Methyl salicylate either in the form of the synthetic product or the true oil of wintergreen has been used. It is generally employed in the form of liniments or massage pastes. It does not seem logical to suppose that it would have any action other than a simple counter-irritant. Its popularity as a specific measure is not warranted by our present knowledge of scientific facts.

Hot Applications. These sometimes seem to give a measure of relief. Among those that have been most employed are electric pads, hot water bottles, hot turpentine stupes or other hot compresses.

Cold Applications. In certain cases cold applications have seemed to be of some value. Among those used are compresses of lead and opium wash applied cold or compresses of such agents as normal saline solution of magnesium sulphate and witch hazel. In the choice of hot or cold applications, it is best to be guided by the preference of the patient.

Ointments. Among the many ointments that have been recommended are those of ichthyol, methyl salicylate and belladonna. The following is typical of this group:

℞		or
Camphoræ,	ʒss	2|0
Ichthyolis,	ʒij	8|0
Ung. Belladon.,	ʒii	8|0
Petrolati,	q.s. ℥j	30|0

M

Sig.—Apply twice daily.

The following routine treatment may be tried with some hope of contributing to comfort. Once a day the area involved is thoroughly but gently cleansed, dried, and painted with equal parts of tinctures of iodine and aconite; this is allowed to dry for twenty or thirty minutes, then the above ointment is freely applied and the involved area snugly and evenly bandaged with flannel. The ointment may be renewed once or twice a day, but the iodine is not used oftener than once in twenty four hours. Should the skin become irritated, the iodine should, of course, be discontinued, and the ointment reduced in strength by the addition of sufficient petrolatum. No special value is claimed for this treatment, but it seems to answer as well as any other and, at least, satisfies the insistant desire of patient and family to have something done. After all it is rather hard to judge of the value of any local measure, as the duration of involvement in any particular joint is usually only a matter of a few days.

Vaccines and Serums. In the secondary forms of arthritis, vaccines probably play a fairly important part in the treatment of certain cases, but in true acute rheumatic fever their value has not been established. Serums are practically unused.

Convalescence.—It is certainly desirable to have these patients carefully supervised during the period of their return to activity. Where possible they should delay any strenuous effort for some weeks after the temperature has returned to normal and the local symptoms have subsided. When activity is resumed, the effect on the heart should be carefully noted. In many of these cases the heart involvement has been of such a character as to escape notice at the time, and it is in these, particularly, that excessive demand on the damaged organ may result in disaster. There is usually anemia, sometimes out of all proportion to the severity of the disease. There is often also a considerable degree of prostration with general impairment of efficiency; these call for tonic treatment, carefully regulated and highly nutritious diet, and much out-door fresh air in favorable weather. Among the tonic preparations it is probable that the pills or capsules of ferrous carbonate with arsenic and strychnine meet the requirements as well as anything else. The ready prepared pills may be ordered, or a prescription may be used as follows:

℞		or	
Strych. Sulph.,	gr. j		06
Arseni Trioxidi,	gr. ij		13
Mas. Ferri Carb.,	gr. ccc	20	00
M. ft. cap. no. L			
Sig.—One after each meal.			

Where there is persistant impairment of the appetite, it may be advisable to give the tonic in the form of bitter solution, such as the elixir of iron, quinine and strychnine phosphate, or the compound solution of glycerophosphates. It should be remembered however, that these formulae do not carry as large an amount of iron as the pills or capsules first suggested.

Complications.—The most common and dangerous of the complications is heart damage, which usually takes the form of endocarditis; there may also be myocarditis or pericarditis. The treatment of these will be discussed under the headings of these special conditions.

SECONDARY INFECTIOUS ARTHRITIS

General Statement. Definition.—This is that type of arthritis that is the result of an infectious process elsewhere in the body. It may be acute or chronic.

Incidence.—No age, race, or type of individual is immune. It is comparatively rare in early childhood and is more common in middle and later life.

Etiology.—Any infectious process anywhere in the body may result in the condition. Among the most common causes are the following:

Acute infectious diseases as scarlatina and typhoid.

Tonsillitis is probably the most common source of trouble. Often tonsils that on superficial examination appear entirely normal, may harbor foci of infection that can lead to unlimited trouble. Within the last decade in the investigation and removal of diseased tonsils scientific investigation has thrown a great deal of light on the etiology of arthritis.

Dental infections have received a great deal of attention within the last few years. Our present knowledge is due largely, to the development of *x*-ray work. It is known now that very often teeth that formerly were considered as perfectly normal are, as a matter of fact, a distinct menace to the health of the individual.

Sinuses as a source of trouble are probably not as common as the tonsillar or dental infections, but still they play a very important etiological role, in fact, some of the most disabling cases of arthritis that I have known have been the result of sinus infection.

Ear disease is not a very frequent cause, but is a contributing factor with sufficient frequency to require routine investigation.

Pyelitis or pyelonephritis are probably a more common cause of arthritis than is generally suspected. I have had the opportunity of observing many of these cases that were relieved by clearing up the kidney condition. It is particularly those cases of chronic kidney infection that are the source of trouble.

Other foci as infection in the prostate, the female pelvic structures, the gall-bladder, the appendix and the colon are occasional causes of arthritis, and disease in these structures must always be eliminated before a diagnosis is complete.

Predisposing causes as age, sex, climate, exposure, and many other factors are of a certain amount of importance, but not sufficient to require detailed discussion here.

Course and Prognosis.—The condition has a tendency to run a rather protracted course, depending very largely on the type of infecting organism, the promptness of instituting treatment, the facilities for treatment, and the general condition of the patient. There is a marked tendency to more or less permanent disability, due principally to the changes that take place in the bones and cartilages. One of the most unfortunate results is the development of pus and the distressing amount of damage that so often results.

There is also a tendency to recurrences and these are quite common unless the primary source of infection can be located and removed.

The tendency is for several joints to be involved; there may be several involved at once or in succession, some clearing up as others are progressing unfavorably.

Symptoms and Diagnosis.—One of the important aids in establishing a diagnosis is the history of the case, particularly as to chronic tonsillitis, dental infections, or other conditions that are known to be of importance as etiological factors. Of interest also are the character of onset, the joints involved, and the statement as to previous attacks.

General Symptoms.—In the acute type of the disease the onset may be rather sudden, and associated with much discomfort and all of the symptoms of an acute inflammatory process. This type may merge into the chronic, or the process may be essentially chronic from the beginning, that is, there may be little fever or pain.

Temperature and Pulse. In the acute type of the disease there may be considerable elevation of temperature with increased pulse rate, though the pulse is not usually out of proportion to the temperature. There may be distinct rigors or chills, followed by profuse sweating. In the chronic type of the disease, there may be little or no fever. Should pus develop, there would follow naturally the usual reaction in the way of fever, increased pulse rate, chills and sweats, such as would be associated with an accumulation of pus from any other condition.

Pain. Aside from the local pain which will be discussed elsewhere, there are usually headache and general body pains, such as would be expected from any infectious process.

Glandular Involvement. There is apt to be some enlargement of the related glands, and in some cases there is a more or less general involvement, though this is seldom marked.

Anemia. There is a definite tendency to anemia. In the cases that run a stormy and protracted course, particularly those in whom proper treatment has been neglected, anemia may be quite profound. This is particularly observed among the cases brought to the charity wards of hospitals.

Loss of Weight. There is probably no more tendency to a loss of weight in this condition than is found in other chronic, febrile, disabling diseases. Here also we find this condition most marked in those cases that have not had the benefit of proper treatment.

Local Symptoms.—At first there is the usual evidence of a chronic inflammatory process in the involved joints; this includes swelling and in some instances redness and local heat. In the more chronic cases, the redness and elevation of temperature may not be observed. Later on, after definite changes have taken place, various evidences may be present. When effusion develops, it may be demonstrated by the usual method of investigation. Pain is one of the most marked characteristics. It is particularly elicited by movement, though in many cases it may be intense even when the parts are at rest.

Early in the involvement of the joints there is the natural fixation resulting from the inflammatory processes and from the effort on the part of nature to prevent motion. Later on, if damage to the structures has resulted, there is limitation of motion which may be overcome by proper measures or may be more or less permanent. Some cases end in complete fixation.

X-ray. This is one of the most valuable aids in diagnosis, not only of the disease, but very often of the type of infection and the extent of the involvement.

Laboratory. The laboratory findings will depend upon the type of infection and its extent. In the acute process, there is naturally an increase in the total white and neutrophile counts; sometimes the rise may be quite marked. In the chronic cases, there may be very little in the way of blood changes.

The urine is affected only to the same extent as is found in other processes of the same type and severity. There may be albumin and some casts, and other evidences of renal irritation.

Differential Diagnosis.—The main condition from which a differential diagnosis must be made is acute rheumatic fever; in this the joint involvement is more transient and usually clears up without permanent damage; it also usually responds in rather a spectacular way to the proper employment of the salicylates. The x-ray is a valuable aid.

Osteoarthritis is difficult at times to eliminate, but the absence of foci of infection and the lack of response to treatment constitute valuable diagnostic information. The relative absence of blood changes is also of importance. The character of the joint involvement as shown by the x-ray will give much information.

Tuberculous arthritis and gonorrheal arthritis usually can be differentiated by the history of these infections elsewhere in the body, the character of the joint involvement, the course of the disease, the x-ray findings, and the lack of response to treatment.

Synovitis usually gives a history of injury. There is a marked tendency to accumulation of fluid which is frequently purulent. The absence of involvement of the bone and cartilages can be demonstrated by the x-ray.

Prophylaxis.—This consists principally in the prevention of or the prompt attention to those diseases that are known to result in this condition. There is a growing tendency on the part of physicians to urge routine general examinations. The dentists have been very much in advance of the medical profession in this particular, and it is probable that the time is not far distant when people will present themselves for thorough investigation at regular intervals. At the present time the examination of school children is doing much to prevent the development of conditions that result in such crippling processes as the one under discussion. The physicians of today should be promoters of the idea that the human body should be kept as nearly perfect as possible, and any deviation, whether in the teeth, tonsils, or elsewhere, should receive intensive attention until a normal condition has been restored.

Treatment.—The primary and essential factor in treatment is the removal of the cause. All efforts at relief are of questionable value as long as the source of trouble is allowed to remain. There is probably no condition that requires a more thorough investigation than the one under discussion. The examiner should not be satisfied with locating one focus of infection, as others may be present. The usual sites of these are well known and should be intelligently sought for. Even with the most painstaking search, it is, at times, impossible definitely to locate the source of the trouble, and in the face of a continued or progressively disabling process, it may be advisable to resort to heroic measures. I do not believe in the wholesale removal of teeth and indiscrimate tonsillectomy, but where there is a doubt as to the integrity of these structures and no other source of trouble can be found, operative measures should certainly be considered.

It must be remembered that the removal of the primary infection leaves the secondary disease process still active, and the patient will require continued treatment. This point is stressed for the reason that patients, and very often physicians themselves seem to consider the removal of the etiological factor as all that is necessary, and expect spectacular relief in the diseased joints. In getting a patient to understand the situation, I have often used the illustration that it is like throwing a torch into a building. After a fire is started, the torch, if it continues to burn, must, of course, be extinguished; but putting out the torch does not stop the fire that is under headway.

General Care.—The management of these cases must depend upon the type of the infection, the location, and the degree of severity, therefore it is impossible to lay down any definite rule that will apply to all.

Rest. This is essential in all cases where joints are involved that would be affected by the activity of the patient. Rest in bed is also essential in all febrile cases.

As the disease has a tendency to run a protracted course, the treatment-quarters should be selected with this in view. The room should be one that lends itself to convenience of treatment. It should be one that can be well ventilated, has plenty of sunlight and, in winter, that can be properly heated. The bed should be comfortable. In bedridden cases, there is a decided tendency to loss of weight; also in many of these cases movement results in pain, so the effort is made to prevent motion. It is essential, therefore, that the bed be of such character as will have the least tendency to the production of bedsores and will give the greatest amount of comfort.

Skilled nursing is, in many cases, indispensable. It requires both knowledge and judgment to be able to handle some of these patients without causing unnecessary suffering. This is also important for the reason that proper nursing lends itself to the maintenance of a proper state of nutrition, and to the success of the various measures that contribute to relief and comfort generally.

Body cleanliness is required here as in other sickness. In those cases in which motion is limited, baths and massage are of particular advantage in preventing damage.

Bowels. In this condition it is probable that proper intestinal elimination has, in some cases, particular value. Liquid petrolatum at night as a routine has some advantage, and further elimination, if necessary, may be maintained by the morning administration of castor oil or salines. Enemas have a distinct field of usefulness, and many employ as a routine measure colon irrigations once or twice a day.

Diet.—This must be influenced to a large extent by the severity of the manifestations, the digestive ability and the nutritional needs of the patient. During the acute febrile stage, it is desirable to avoid the possibility of harm by being conservative in the administration of food. At this time such articles may be given as water, carbonated drinks, tea and coffee (if the patient is accustomed to them), malted milk or similar drinks, buttermilk, fruit juices, and cereal broths. As the condition of the patient improves, effort should be made to increase the diet rapidly, particularly if there is already a deficiency in weight. Such articles may be added as milk, cereals, breads, the white meat of poultry, and baked or broiled fish. As further improvement takes place, the diet can be increased, depending upon the requirements. Particular attention should be given to sufficient intake of water. The patient should also be observed for flatulence, or other evidences of imperfect digestion.

General Medication.—Nothing in the way of a specific has been found. Various medicinal agents have, from time to time, been suggested, but the material value of any has not been established.

The salicylates may be thoroughly tried out, unless there is some definite contra-indication. If improvement does not take place, their use should not be persisted in too long, as their continued employment may interfere with the general health of the individual. This refers particularly to sodium salicylate. Acetylsalicylic acid may be used when needed for relief of pain throughout the course of the disease, if no contra-indications develop. These may be employed as suggested for acute rheumatic fever, page 279.

Guaiacol carbonate has many advocates. It is given in doses of 15 to 30 grains (1 to 2 Gm.) The following prescription will illustrate a frequently used combination.

℞

		or
Acidi Acetylsal.,	gr. c	6|5
Guaiacol. Carb.,	gr. cc	13|0

M ft. cht. no. x
Sig.—One every four hours till relieved.

Arsenic has been rather extensively used, and the preference seems to be for small doses, 2 or 3 minims (0.13 to 0.2 cc.) of Fowler's solution or $\frac{1}{20}$ to $\frac{1}{30}$ grain (0.003 to 0.002 Gm.) of arsenic trioxide. This is usually administered in association with other agents, particularly iron.

Iodides. These have been extensively employed but their benefit is rather uncertain. The preparation most commonly used is the syrup of ferrous iodide; which is given in doses of 15 to 60 minims (1 to 4 cc.), three times a day. This should be used with care to protect the teeth, particularly in the case of young people. It is also best to begin with small doses so as to test out the tolerance of the patient, as it has a decided tendency to produce iodism. The potassium or sodium salt may be used.

Iron is employed largely in an effort to build up the body's resources, particularly to combat the tendency to anemia. Practically all of the common preparations of iron are used.

Local Measures.—In any disease as common as this type of arthritis and of as long duration, it is quite natural that many plans have been tried out in the way of local measures. Many of these have little, if any, value. Some of them, at times, may contribute to relief. There is none that will apply to all cases, and often it is advisable to try out one after another until something is found that will be of benefit. Among those that have been most frequently recommended are the following:

Fixation. A certain amount of immobilization is necessary whenever a joint is diseased. Nature promptly makes an effort at this, and in carrying out the various plans that have been suggested for fixation we are but aiding the natural processes. The degree of fixation depends, of course, upon the type and location of the infection. Where the knee or hip is involved, splints, or properly protected sand bags, may be required. Very often sufficient protection can be given by the use of pillows or bolsters. In the other joints frequently a large pad of dressing meets the requirements. Sometimes mechanical devices are necessary. The greatest care should be used not to continue the fixation sufficiently long for ankylosis to take place. This will be discussed later.

Heat and Cold. Heat in the form of the electric pad or hot water bottle will sometimes contribute largely to the comfort of the patient. The ice bag has been rather extensively employed and, at times, with considerable relief. The ice bag is more indicated in those cases where the joint shows evidences of acute inflammation, such as redness and local heat. It is impossible to predict in advance the effect of either of these, and the continuance of one or the other may usually be left to the patient.

Wet Compresses. These are used either hot or cold. Various solutions have been employed, such as tap water, normal saline, solution of magnesium sulphate, lead and opium wash, and solution of ichthyol. Here again it is usually the case that, in the acute inflammatory processes, the cold compresses are most indicated, though as a rule it is best to be guided by the results as voiced by the patient.

Other Applications. Painting the involved areas with iodine has been frequently recommended. Where the ordinary tincture of iodine is employed, it is very apt to cause irritation, particularly if the application is repeated often. Equal parts of the tinctures of iodine and aconite makes the most satisfactory application. This can usually be employed once or twice a day for many days without local discomfort.

Among the other measures that have been rather extensively used are ointments or linaments containing methyl salicylate (either the synthetic or the true oil of wintergreen), chloroform linament, solution of guaiacol in olive oil, and ichthyol ointment of various strengths.

The following application seems to be beneficial in some cases:

℞		or
Camphoræ,	ʒss	2 0
Ichthyolis,	ʒij	8 0
Ung. Belladon.,	ʒij	8 0
Petrolati,	q.s. ℥j	30 0

M.
Sig.—Apply as directed.

This is applied twice a day. No special value is claimed for this or any of the measures that have been mentioned. It is usually employed by first having the area painted with the tincture of iodine and aconite, allowing it to dry for fifteen or twenty minutes, then applying the ointment and covering with flannel; this is renewed after twelve hours.

Massage. In the acute inflammatory processes, massage is out of the question. After the acute stage has subsided or in the chronic cases, a certain amount of massage is often of value. The principal benefit is probably in improving the circulation and the muscle condition of the limb involved, in this way overcoming to some extent, at least, the injurious results of enforced inactivity.

Manipulation. A certain amount of passive motion should be begun as early as possible so as to prevent ankylosis. This, applies particularly to the joints after the acute condition has subsided or to cases that are more chronic in type. It should be carried out with much caution. It very often causes less discomfort if it is preceded by ten of fifteen minutes of hot soaking or the application of hot compresses.

Bier's Hyperemia. This has been extensively used and may be attended with benefit.

Baking. Particularly in the chronic forms the application of high degrees of dry heat is of marked benefit in selected cases.

Symptomatic Treatment.—The primary symptom for which symptomatic treatment is necessary is the relief of pain. The measures previously suggested often will meet all of the requirements for the relief of this symptom; that is, rest, general and local; the use of salicylates, particularly acetylsalicylic acid; and local applications. Where more effective measures are necessary, codeine is probably the most satisfactory agent. It may be used by mouth or needle, when indicated for pain of sufficient severity. A prescription somewhat as follows may be given:

℞		or
Codeinæ Sulph.,	gr. iv	25
Acidi Acetylsal.,	g. c	6 50
M. ft. cht. no. xij		
Sig.—One every three hours when needed.		

The restlessness and insomnia that at times are a source of trouble will usually subside if pain be sufficiently relieved. The measures as suggested above will usually meet the requirements. At times the bromides or barbital may be employed to advantage.

Anemia and Loss of Weight. These conditions are probably best met by the early institution of as nutritious a diet as the condition of the patient will justify. As convalescence is established, tonics may be used to advantage. Any of the well known preparations containing iron may be employed.

Vaccines. In many cases vaccines seem to contribute to the other measures that are being used. The autogenous vaccines are the most satisfactory; for example, where the arthritis seems to be the result of diseased tonsils, the vaccine should be made from the tonsils and used as indicated. Sometimes the organism may be obtained from the diseased joints. It is well to begin with a small dose and test out the reaction of the patient. The plan that seems to give the best results is to use a dose sufficient to produce a certain amount of local and constitutional reaction without causing too much disturbance. As suggested, the succeeding doses may be determined by the extent of the reaction occasioned by the preceding dose. The reaction should be allowed to subside or nearly so, before the next dose is given.

Intravenous Therapy. Exceedingly good results are sometimes obtained by the injection of some foreign protein. About three minims (0.2 cc.) of typhoid vaccine is the most commonly used agent. Milk is also employed. The injection is followed by a chill and high temperature then often by an amelioration of all symptoms. This may be repeated about once a week as indicated. Mercurochome is administered intravenously in doses of about 10 cc. of the one percent solution (for an adult). There is usually a sharp reaction characterized by a chill and high temperature following which general improvement often takes place. This may be repeated in five to seven days if indicated.

Convalescence.—This is a condition in which it is particularly inadvisable to permit the patient to return too early to his usual activity. Outdoor fresh air and sunshine in favorable weather constitute a part of the treatment, particularly after the acute symptoms have subsided. The actual use of damaged joints should be begun with considerable caution. Of course the duration of restrictions will depend largely upon the location of the involvement; where it is the lower extremities, the restrictions would be much longer than where the involvement is in joints not affected by walking.

During convalescence, the diet should receive particular attention, and tonics used, if indicated. The patient should be under more or less constant observation for a considerable time in order to observe the progress of repair and to detect any evidences of recurrence.

Surgery.—Secondary arthritis is often classed under the head of surgical diseases of the joints. It is rare, however, that actual operative measures are indicated. If suppuration takes place in a joint, it should receive prompt attention. Sometimes a non-purulent effusion will require removal. At times surgical measures are necessary to repair damage that has been done, such as ankylosis. As suggested in the beginning of this discussion, surgical measures are very often necessary to remove the cause of the trouble, such as diseased tonsils or dental infections. Aside from these exceptions, operative measures are seldom indicated.

Extensive abdominal operations, such as colectomy, have had many advocates in the past, but if they have a field of usefulness, it would hardly apply to this particular group under discussion.

Complications.—Complications arising in the course of this disease, such as heart involvement, would be handled as the same conditions occurring from other causes.

OSTEOARTHRITIS

General Statement. Definition.—As previously stated it is rather difficult to make a definite classification of joint infections and adhere to it throughout in discussing diagnosis and treatment, as this phase of the subject is still far from being settled. Under the above heading will now be considered the so-called primary joint infections, that is, those that are not the result of some focus of infection elsewhere in the body. It is that group which is supposed to result from faulty metabolism. Among those names that have been suggested by various students are osteo-arthritis, primary arthritis, progressive arthritis, chronic primary arthritis, polyarthritis, and arthritis deformans. This disease or group of diseases is characterized by joint involvement of a chronic, progressive, disabling character, without definitely established cause, unless faulty metabolism be accepted. There is much evidence in favor of this as the main etiological factor, and, at the present time, possibly the nearest approach to successful treatment is based on this possibility.

Incidence.—The disease is largely one of adult life, though comparatively young persons may be affected. The hypertrophic type is particularly apt to affect those advanced in years. Both sexes are susceptible.

Etiology.—Nothing definite is known. A disturbance of metabolism has been suggested by some. There seems to be some relation at times between this type of arthritis and chronic intestinal disease.

Course and Prognosis.—The disease is distinctly chronic and resistant to treatment. More or less permanent damage results in a large percentage of cases, as, in spite of all treatment, they go on to progressive disability.

Symptoms and Diagnosis.—Among those factors of importance in establishing a diagnosis is the history. Of particular interest here is the time of onset; the absence of an infectious process that would justify placing the disease under the head of secondary infectious arthritis; and the fact of chronicity or progressiveness, and resistance to treatment.

Onset.—This may be comparatively sudden with all the signs and symptoms of inflammation or it may be gradual, the evidences being principally stiffness and gradually developing disability.

Constitutional Symptoms.—Particularly in the atrophic type there is usually marked discomfort. The progress of the disease is characterized by periods of fever and the general evidences of impaired health. There is a tendendy to anemia, loss of appetite, restlessness, sleeplessness, and that train of unfavorable symptoms that go with any disabling, persistent disease. In addition to this, it will be remembered that if the primary cause of the condition is faulty metabolism, we would expect a more progressive tendency towards an impaired state of well-being. There are no particularly characteristic symptoms. In the class known as hypertrophic, the onset is apt to be more insidious and the whole course usually more benign.

Local Findings. In the atrophic type of this disease, there is an actual loss of bone substance. Various joints may be involved; the fingers seem to suffer particularly, though various other joints may be implicated in the process. Throughout the acute stage of the disease or that of temperature elevation, there is pain, swelling, often redness, and other evidences of an active inflammatory process. The pain at times is intense.

In the hypertrophic arthritis, the larger joints are more apt to be involved, such as the hips, knees and wrists. The local manifestations are more gradual in developing and there is less tendency to inflammatory evidences. The whole local course of this type is more benign than of the other. Both groups are apt to show periods of exacerbation of all the evidences, particularly of fever and pain.

Prophylaxis.—As the etiology is so imperfectly understood, it naturally results that our ideas of prophylaxis are rather indefinite. It is certain, however, that maintaining a general state of well-being including proper eating, digestion, assimilation and elimination are factors in preventing the development of this condition.

Treatment.—It is difficult to try to offer a system of treatment for a condition the cause of which is so little understood, and one in which the results of treatment have been so unsatisfactory. In one recent treatise almost one hundred different drugs or local measures were suggested. This is one of the conditions in which it is hoped that the future will show a better understanding.

General Care.—As the condition is distinctly chronic, disabling, and shows a tendency to impaired health and lowered nutrition, it is essential that, from the very first, treatment be directed with those possibilities in view. During the periods of exacerbation when pain, tenderness, fever, etc. are present, absolute rest in bed is required. The bed should be such as will contribute to the comfort of the patient, and in the bedridden cases the selection of a proper bed is of major importance.

The matter of fresh air, sunlight, and proper heating facilities should be arranged with the greatest possible care and attention to detail. When the acute symptoms have subsided, a comfortable rolling chair is desirable. In favorable weather, the patient is best kept out of doors a good part of the time. It should be remembered that exposure to cold or inclement weather is undesirable. The patient must be properly clothed in cold weather and particular attention should be paid to this matter. Too much covering or clothing or covering that would cause discomfort or excessive perspiration should be avoided.

Climate. Climate is also an important consideration in some cases, though this is a matter that has to be individualized. There is not sufficient benefit as a rule to justify any great hardships to move the patient. Where it can be done with convenience to all parties concerned, a warm, equable temperature, dry air and elevation may be tried.

Diet.—This will be discussed under general treatment.

General Treatment.—The key note of the general treatment is to keep the patient in the best possible physical condition. There is no specific medication. Some of these cases seem to be benefited at times by the salicylates; this treatment should not be persisted in if improvement is not evident, as the tendency is to disturb the digestion and at times cause other disagreeable side effects.

Iodides have been rather extensively employed, such as the iodide of sodium or potassium or the syrup of ferrous iodide; their value is questionable. The improvement of many patients due to mercury and iodides is probably the result of these cases being also syphilitic.

Arsenic and iron which are employed more or less in a large majority of cases are of benefit probably by combating the tendency to anemia, loss of appetite, etc. It is probable that arsenic and iron should be classed as agents to be used in the symptomatic treatment instead of considered as having any general benefit on the course of the disease process.

Attention to elimination is important in this condition as a definite therapeutic measure; frequent colon irrigations are used by many; others urge the use of rather systematic purgation or both measures in combination.

Diet. Pemberton has presented some rather interesting and convincing data with reference to the dietetic treatment of the disease. The plan is based on the supposition that the condition results from faulty metabolism, particularly in the handling of proteids and carbohydrates. It is urged, therefore, that these be reduced and the fats increased. The extent to which the diet can be limited depends, of course, upon the condition of the patient. The emaciated patient or the one that has already reached the later stages of the disease will not naturally be a favorable subject for radical measures.

This treatment applies particularly to the earlier stages of the disease and to those in a fair state of nutrition. The diet is reduced to the lowest point compatible with maintaining a favorable nutritional balance. Hunger is satisfied by giving bulky foods that do not contain much in the way of nutrition. In the way of fats, olive oil is particularly recommended, and it is probable that a large part of the benefit results from the therapeutic effects of this agent. Olive oil in addition to being highly nutritious is a laxative of decided worth and, in the opinion of many, has other effects that may be of value here. In this plan of treatment, the patient is given three meals a day of the type of food suggested above, paying due attention to the individual's condition and digestive ability; and olive oil is given about two or three hours after each meal, ½ to 1 fluidounce (15 to 30 cc.) can usually be taken. In addition, cod liver oil is also highly recommended.

Local Measures.—These do not seem to materially influence the course of the disease process, but they certainly give a certain amount of relief in some cases. All of those measures that were suggested for the other types of arthritis may be employed here. This includes hot or cold compresses, various ointments and other applications, massage, baking, etc. See page 290.

Surgery.—Surgical measures that have been most common may be grouped under two heads: first, those employed in treatment; and second those that are directed at lessening the disabling effects of the disease. In the way of treatment, operations upon the digestive tract have been advocated by many. The one most frequently employed is colectomy. In the effort to lessen the permanent disability resulting from the advanced stages of this disease, various measures such as excision of the joints have been employed with benefit in selected cases.

SYNOVITIS

This is a condition resulting from the infection of the joint capsule and often involving some of the surrounding soft structures. The infectious type of synovitis would have the same etiology and practically the same treatment as infectious arthritis. It is usually impossible to distinguish the two, and in fact they might be considered often as being different stages of the same process.

The synovitis resulting from trauma is essentially a surgical condition and hardly comes within the scope of this article.

GOUT

General Statement. Definition.—Gout is a constitutional disease expressing itself particularly by the involvement of certain joints, the retention of uric acid in the blood and a tendency to the deposit of sodium biurate in certain localities.

Several types have been differentiated, such as acute and chronic. Another grouping is into the following classes. One that is found particularly among those who indulge in luxurious living and limited exercise, affecting especially those who are in a high state of nutrition. The other type, frequently called poor man's gout, affecting principally those who are the victims of malnutrition and exposure, and is found among those who are in a lowered state of nutrition.

Incidence.—In some sections of the country this is a fairly common condition; in others, it is rare. Many physicians practice for a life time without ever having a case, others report a fairly large series. In my many years in the Charity Hospital I have never had a case in my service to show to my classes. It might be argued that the type of patients there would, naturally, be those among whom the condition would be less common; at the same time, a charity service draws, to a rather large extent, from cooks, chefs and others who certainly indulge in those things that are classed as among the more common etiological factors.

The disease is usually one of middle life, the majority of cases occurring in the third or fourth decades, though younger and older persons are not immune. The vast majority of cases are among males. While any people may be affected, it is usually a disease of the white race.

As previously mentioned, there is a poor man's gout that seems to be the result of faulty living conditions, such as malnutrition and exposure. The greatest number of cases occur, however, among the "idle rich" or those who more nearly approximate that condition.

This is more particularly a disease of colder climates, especially those that are subject to frequent changes and where there is much dampness. The geographical distribution is affected by the social conditions under which the people live, therefore, it is more frequent in those countries where there is a larger leisure class. For example, the disease is rather common in the British Isles.

Gout is more prevalent in the spring and fall, though it may occur at any season.

Etiology.—While there is still considerable uncertainty as to some of the etiological factors, there are others that seem to have been well established. Among these are heredity; a diet rich in proteids, particularly nucleo-proteids; sedentary habits; alcoholic and malt beverages; exposure; rheumatic fever; certain forms of nephritis; and certain types of poisoning, particularly lead. It is probable that many other factors play a part, some of which have been touched upon under incidence.

Course and Prognosis.—The acute attack usually lasts from one to two weeks, gradually subsiding with little or no evidence of permanent damage. The patient may never have another attack, or there may be recurrences after a lapse of months or years. When there are succeeding attacks, there is a tendency to more or less permanent impairment. The development of succeeding acute attacks or of the chronic process usually depends largely upon the particular individual, that is, as to how he lends himself to the recognized measures of treatment, particularly from the standpoint of a readjustment of his diet and activities. The disease in itself is seldom fatal, but it unquestionably lessens life expectancy by renal damage, lowering resistance or by the disability that frequent acute recurrences or the chronic process entails. Chronic gout sooner or later leads to disability that at times is practically complete.

Symptoms and Diagnosis.—There is seldom much difficulty in making a diagnosis of this condition in the usual type of the disease. A careful evaluation of available clinical data is fairly conclusive. To begin with, the type of individual should be considered; that is the well-fed, rather stout, middle-aged man who is a heavy eater, particularly of meats, who takes little exercise, and is rather addicted to alcoholic or malt beverages.

History. Of particular interest here is the matter of heredity, and it will often be found that the other members of the family have been affected with the disease or some related condition. A history of previous attacks is always of importance in establishing a diagnosis. An investigation should be made into the manner of living, especially from the standpoints of diet, alcoholic drinks, and exercise.

Onset. This is usually rather sudden, though at times there may be a preceding period of general indisposition, headache and malaise. The attacks usually begin at night.

Fever. In the acute attacks, there is elevation of temperature, though this may not be high. The fever usually lasts from three to six days, gradually subsiding.

Pain. In addition to the local pain, there is usually headache and general body discomfort, though these may not be in excess of what might be expected from an acute febrile process.

Gastro-intestinal Symptoms. In the majority of cases these are rather pronounced. During the acute attacks, there is anorexia, nausea, and often vomiting. It is probable that the gastric symptoms in many cases are at least partially the result of efforts at medication. Dyspepsia is a fairly common condition, and it is usually of the acid type. In many of these cases, before, during, or after the attacks, gastric disturbances may be an outstanding feature.

Local Evidence. Acute Attacks. The chief characteristic of the disease is the involvement of one or more joints, in the majority of cases the metatarsophalangeal joint of the great toe on one side and occasionally on both. Other joints, such as the ankle, knee, wrist or elbow, may be affected. The involved area becomes swollen, red and exceedingly tender and painful. Sooner or later the patient develops edema of the neighboring tissues. As the acute process subsides, there is usually desquamation of the cuticle.

In the chronic cases, the principal effects are deformity and limitation of motion. There is also a tendency to the deposit of sodium biurate, not only in the involved joints, but in other parts of the body, particularly the cartilage of the ears.

Laboratory. The urine in the acute febrile period may show albumin and casts, but the principal finding is the changes in the percentage of uric acid and salts. As nephritis is an etiological factor or an associated condition in so many cases, functional kidney tests should always be made.

Blood chemistry is an important part of the investigation. Where facilities are available, this should always be resorted to.

The *x*-ray examination of involved joints may be of much value in establishing a correct diagnosis.

Differential Diagnosis.—The principal conditions that have to be eliminated in establishing a diagnosis are acute local infections (felons), rheumatic fever, secondary arthritis, and, in the chronic cases, arthritis deformans. A careful study of the clinical data, particularly with the aid of the laboratory and x-ray, will seldom leave any doubt as to the true condition.

Treatment.—The management of gout can be divided into the treatment of the acute attacks and the prevention of recurrences or of a chronic process.

Acute Attacks.—As has been previously stated, this is usually a short and stormy process, characterized by much pain and by a temporary disability that is usually total. The effort, therefore, is to relieve discomfort and to shorten the course of the attack.

General Care.—During the febrile stage, there should be absolute rest in bed, but as the temperature subsides, the patient may be allowed to get up, provided the affected member is properly protected. For example, if the disease attacks the foot, the patient may be allowed to sit in a comfortable chair, preferably of the Morris type, with the foot resting on a pillow placed on a stool and so arranged that there will be sufficient elevation.

During the febrile period, of course, every effort should be made to exclude noise, business or domestic worries, or anything else that would add to the already full measure of discomfort that is always experienced.

Diet.—One of the most important considerations here is the giving of sufficient liquids. Where the renal and circulatory symptoms do not contraindicate it water should be given freely, either as such or in the form of suitable drinks. About five or six pints daily is usually the amount desirable. During the acute attack, particularly care should be exercised in excluding material that is known to be a possible causative factor. This includes particularly alcoholic and malt drinks, and meats, such as liver, sweetbreads, brains and kidneys. The acute seizure is usually short and there is no necessity for a high caloric intake This is particularly the case with those patients who are already in a state of over-nutrition.

During the period of fever, such articles may be used as seltzer or vichy or cereal broths that have been prepared without meat. Tea and coffee may be allowed, unless contraindicated. Diluted fruit juices prepared with milk sugar are agreeable to the patient and aid in nutrition and water intake. As the fever subsides, the diet may be increased by well cooked cereals, toast, fruits and simple vegetables, such as potatoes. The diet after the subsidence of the acute symptoms may be the same as that discussed under the head of treatment of chronic type, page 302.

Medication.—Many drugs have been recommended, among them the following have been proven of most value:

Colchicum. This is best given in the form of the Tincture of Colchicum and the average dose is 15 minims (1 cc.), repeated every three or four hours until relieved. Nausea or purging, unless some other cause can be located, should cause one to suspect the development of unfavorable effects from the drug. Colchicum when used for the relief of pain should be discontinued if it is not meeting the requirements of the particular case. Sometimes it is used in combination with other drugs, as will be shown in the succeeding paragraphs.

Salicylates. These have been extensively used in the treatment of the acute attacks, and to a lesser extent for the chronic form of the disease. Of the salicylates the acetylsalicylic acid probably has most effect for the relief of pain. It is used in five to ten grain doses, given every three or four hours until the pain is relieved, unfavorable symptoms develop or it is found desirable to try some other form of medication. Sodium salicylate has been given very much as in the treatment of rheumatic fever. The following prescription will illustrate:

℞		or
Sodii Salicylatis,	℥j	30|0
Tinct. Colchici,	f℥j	30|0
Aquæ	q.s. f℥iv	120|0

M.

Sig.—Teaspoonful in water every 3 hours till relieved.

There should be given with this sufficient alkalies to neutralize the hydrochloric acid of the stomach.

Phenyl cinchoninic acid (atophan, cinchophen). At present this is probably the most commonly used agent for the relief of the acute attacks. It is usually given in doses of about 7½ grains (0.5 Gm.) repeated every three or four hours until effective. It does not seem advisable to continue with this indefinitely, the more common plan being to employ it for a period of two or three days, then either to reduce the dose or discontinue it entirely for a time. It is given either in capsules or in tablets.

Alkalies. These are used very much as in the treatment of acute rheumatic fever, except that the tendency is to use potassium instead of sodium salts, on the supposition that the latter would favor the deposit of sodium biurate. Potassium citrate or potassium bicarbonate in about thirty grain (2 Gm.) doses are used. Many physicians recommend and use large doses of sodium bicarbonate, particularly where sodium salicylate is employed. Where one of the drugs fails to meet the requirements in a reasonable length of time, it is advisable to try another.

The alkalies are not used alone as much as associated with the other agents that have more specific value.

Local Measures. Protection. Every effort should be made to protect the area involved from any disturbance that would cause additional discomfort. When the foot is involved, measures should be employed to prevent the bed covering causing undue pressure or injury occurring during sleep. Various mechanical devices are used. The common plan is to use several layers of gauze carefully applied, cover this with sufficient bandage, and wrap the whole in heavy material such as large bath towels. This not only protects the diseased joint, but sometimes seems to contribute to the relief of discomfort.

Elevation. Any acutely inflamed member is more comfortable when elevated, and this seems to apply particularly to gout.

Local Applications. Either hot or cold wet compresses may be of benefit, and it is often desirable to try both, using that which seems to give the greatest amount of relief. Various solutions have been used, such as normal saline, solution of magnesium sulphate, lotion of lead and opium, aqueous solutions of ichthyol, and witchhazel. There is no specific value in any of these and they may be used as apparently indicated.

Various other applications have been advocated, among them the following ointment:

℞

			or
Camphoræ,		ʒss	2|0
Ichthyolis,		ʒii	8|0
Ung. Belladon.,		ʒii	8|0
Ung. Aquæ Rosæ,	q.s.	℥i	30|0

M.

Sig. Apply freely twice a day.

Bier's Hyperemia. This is employed by many and may be considered as among the measures that are at times of value.

Radium and X-ray. These have their advocates, though naturally they are not used as frequently as some of the other measures discussed.

Convalescence.—After the acute inflammation has subsided massage and passive motion should be instituted, under careful supervision, so as to lessen the tendency to permanent disability. Baking is also of value in this stage of treatment. As soon as conditions will justify it, modified exercise should be resumed. It should be carefully supervised in order to prevent damage and the return to normal activity must be regulated by the indications in the individual case. Potassium iodide is extensively used during convalescence, and it is used empirically in various doses, either alone or in combinations. As convalescence progresses, the physician should avail himself of the opportunity to start the patient in the normal manner of living. The causes of gout should be explained as far as we understand the subject and the patient impressed with the fact that a recurrence of acute attacks or the development of a chronic condition will depend largely upon the extent to which he cooperates. Alcoholic drinks must be prohibited, also excessive eating, particularly of animal foods. Proper exercise should be taken, exposure avoided, elimination maintained. The matter of climatic treatment, water cures, etc., will be discussed under the head of chronic gout.

Treatment of Chronic Gout.—Acute attacks occurring in the course of a chronic gouty condition should be handled as outlined in the preceding pages.

Diet. These patients should have their diet so adjusted as to give them sufficient nourishment without over indulgence and to avoid those foods that may be a source of trouble. They should be large milk drinkers, and may be allowed any reasonable amount of fruit, cereals and vegetables. Tea, coffee and cocoa are permitted. Meats may be used in moderation, particularly such as bacon, fish and poultry. Red meats are still considered by many as less favorable, and glandular meats such as liver, kidneys, etc., are best avoided entirely. Eggs may be included in the diet. Alcohol should be prohibited. The patients should take sufficient nourishment to keep the weight approximately up to the standard average for their height and age. It is better to keep it a little below the average than above. Water should be used in fairly large amounts unless countra-indicated.

Exercise. Depending upon the condition of the patient from the standpoint of joint involvement and renal and circulatory conditions, exercise should be maintained at as high a level as seems advisable. Violence should be avoided, also those exercises that might entail exposure or traumatism. Walking, golf and setting up exercises are probably best, though other forms may be indulged in.

Exposure. Exposure should be avoided in every way possible. As previously suggested, all forms of exercise and recreation which entail exposure should not be indulged in. Warm clothing and thicksoled shoes should be worn. Working and living quarters must be properly ventilated and properly warmed in cold weather.

Climatic Treatment and Water Cures. It is undoubtedly a fact that a warm climate and one that is comparatively free from sudden changes is of advantage. Various resorts and "cures" claim particular merit. This is at least questionable. There is certainly no specific climate or place for the treatment of gout.

Other Considerations. Throughout the course of management of all forms of this disease, careful attention should be given to the kidneys and circulatory apparatus, the renal function and the state of nutrition. Any abnormality in any of these should receive prompt attention and the management of the case should be such as to prevent the development of trouble from these potential sources.

DISEASES OF THE HEART

ACUTE ENDOCARDITIS

General Statement. Definition.—This is an acute inflammatory involvement of the lining of the heart. The process principally affects the valves. The disease is not often primary, but usually results from infection elsewhere in the body. In the course of years, the nomenclature of this condition has undergone many changes and we have now such subdivisions as simple, benign, rheumatic, verrucose, septic, ulcerated and malignant. These are sometimes placed in two groups, the first three coming within the first group and the last four coming within the second. The tendency of modern writers is to consider acute endocarditis under two heads, simple and malignant; these are at times subdivided into types, as the typhoidal or cerebral, depending upon the clinical manifestations in the course of the disease. There is no sharp line of demarkation between the simple and the malignant types, and it is much like dividing typhoid fever into mild and severe. What seems simple endocarditis today, may appear in its severest form tomorrow, or the reverse may, at times, occur.

In this discussion the effort will not be made to consider the subdivisions except as may be necessary from the standpoint of severity.

Incidence.—There is considerable difference in the statistics gathered by various observers. The majority of cases certainly occur in the first four decades of life. It is relatively infrequent in infancy and old age. As it is a condition that is usually secondary to acute infectious diseases, it naturally follows that most of these cases occur during that period of life when the individual is most susceptible to these etiological factors.

Opinion is also not unanimous as to the relative frequency in the sexes, some claiming that there is no appreciable difference, others that it is more common among males.

There is some family tendency to this condition, just as we find family tendencies to tonsillitis, rheumatic fever or chorea.

Etiology.—As previously stated, this is not usually a primary condition, but develops from an infection elsewhere in the body. A large per cent of cases seem to result from the so-called rheumatic group of diseases, that is tonsillitis, rheumatic fever and chorea. Any focus of infection may be a cause, as dental abscesses, or infected prostate or gall-bladder. Among the other etiological factors are scarlet fever, diphtheria, pneumonia, and, in fact, any one of a large group of well-known diseases.

From the foregoing it will be readily understood that there is considerable variety in the causative organisms found to be operative, among the most common being the micrococcus rheumaticus, streptococcus, staphylococcus, pneumococcus and influenza bacillus.

Course and Prognosis.—It is probable that the majority of cases of endocarditis are never recognized. This condition as a cause of death is infrequently found, while it is extremely common to find hearts that show evidence of having suffered from more or less extensive involvement, as we may consider that a large percentage of murmurs are the result of past endocarditis. We have only to refer to such statistics as those accumulated during the examinations incident to service in the late war, to realize how common the condition must be. These damaged hearts, of course, only represent those cases of at least moderate severity. It is highly probable that most cases are so mild as not to leave demonstrable evidence. Again it is certainly reasonable to suppose that endocarditis is a terminal condition in many cases of disease in which the original process (as pneumonia) obscures the evidence of this condition.

In those cases that are recognized, two principal factors have to be taken into consideration:

First, the condition of the patient other than the heart involvement, for example, in pneumonia, septicemia or rheumatic fever, the heart infection may be only one of the serious factors that have to be taken into consideration.

Second, the condition of the heart. It is impossible to estimate fully the extent of the damage or the outcome from the standpoint of serious possibilities; it is only possible to form an opinion by the careful evaluation of all the obtainable clinical data.

Under all circumstances, a guarded prognosis should be given. In the simple cases the majority go on to more or less complete recovery. In the severe or so-called malignant types, the outlook is highly unfavorable. As a rule, the course of the infection is from three to six weeks, but often what seems to be a simple case may drag on for months or years. In practically all cases, if there be much inflammation, more or less permanent damage results. One of the principal factors in recovery is the ability to eliminate the source of primary trouble and, therefore, lessen the chances of continued infection.

Symptoms and Diagnosis.—In any condition arising from such a variety of sources and presenting such marked differences in tendency and involvement, it is quite natural that there should be a wide range in symptomatology.

Many cases unquestionably run their course without giving any evidence whatever, and many others without giving symptoms that would be noted unless the patient was under close observation.

Only certain general principles can be stated in the matter of symptomatology. Any one or more of these evidences may or may not be present. It is difficult even to give these in anything like the order of their frequency or importance.

History. Of particular importance here is the history of previous heart disease or of a condition known to be a more or less common cause of heart disease, such as a focus of infection, acute tonsillitis or rheumatic fever.

Onset. This depends, of course, largely upon the infecting organism. It is probable that in a majority of cases it is insidious. In some instances the evidence is rather abrupt, and the patient who is apparently progressing fairly well is stricken with pain, prostration, high fever, or any one or more of the common symptoms of this condition.

Pain. This is not a constant symptom, but one that may show considerable range in degree. There may be more or less definite pain in the precordia which radiates to the left shoulder and down the arm. A common type, however, is a general discomfort in the region of the sternum. There may be headache and considerable body discomfort, such as would be expected in any acute febrile process.

Fever. This may be so slight in the mild cases as to pass unnoticed, while at other times the temperature may be very high, frequently running to 105 or 106. One of the main characteristics from the standpoint of temperature is an unexplained elevation occurring during or towards the close of some other process. In other words, a patient suffering from some other disease known to be a cause of endocarditis shows a rise of temperature or a persistent fever that is not otherwise accounted for.

Chills. There may be frank chills of marked severity, however, there is more commonly a tendency to rigors. In the septic type of the disease, these rigors are often quite pronounced, and caused by the lodgment of septic emboli.

Sweating. This is not usually out of proportion to the severity of the rigors and the degree of prostration. In most septic processes, particularly those characterized by rigors, this tendency to sweating is found.

Nervous and Psychic Phenomena. Among these evidences may be such as nervousness, restlessness, irritability, delirium, convulsions and coma. There is no constant finding that constitutes definite evidence of the disease, probably the most frequently met with is a tendency to insomnia.

Dyspnea. In the majority of cases dyspnea is not a marked symptom. In those cases characterized by circulatory embarrassment, there is a greater or lesser degree of dyspnea naturally to be expected.

Gastro-intestinal Disturbances. These include such symptoms as anorexia, nausea, vomiting, diarrhea and epigastric or abdominal discomfort or pain. Of these the most frequent are anorexia and nausea. It is probable that in many cases the gastro-intestinal disturbance is the result of efforts at medication, such as the use of the salicylates or digitalis.

Facies. Particularly in the severe infections, the patient looks sick, this sometimes being quite pronounced. The anxious expression so often noted seems to bear some direct relation to the degree of circulatory embarrassment.

Skin. Occasionally there is a dusky hue to the skin, particularly the extremities. In cases of circulatory embarrassment, this may be pronounced. Petechiæ frequently appear and constitute valuable diagnostic evidence.

Anemia. There is a marked tendency to the development of anemia, very often this is a symptom of some importance in establishing a diagnosis.

Pulse. The tendency is to a rapid, irregular pulse. The irregularity may be in time or force or both. The type of pulse, of course, depends largely upon the condition of the patient, particularly from the standpoint of the character and extent of the heart involvement. Arhythmia may be a late manifestation or not develop at all. Many variations of the pulse such as the dicrotic or water-hammer are sometimes found.

Blood Pressure. There is usually lowered blood pressure. This may not be marked, particularly in the mild cases or in the earlier stages of involvement.

Examination of the Heart. In the mild cases no noticeable changes may be found. When evidence of heart change is present, it is usually in the severer cases or later in the course of the disease. There may be an increase in the area of dullness, a diffusion of the apiceal impulse, the development of thrills, and, most constant of all, one or more of the various murmurs. These, naturally, depend upon the location and the extent of the disease process, the most common being that of mitral regurgitation. The murmurs probably constitute the most valuable diagnostic finding. Of particular importance is the murmur which develops after a previous examination had demonstrated that there was none present. In those diseases where endocarditis is a possibility, the heart should be examined on every visit and the presence or absence of a murmur noted; then future findings can take their proper place as clinical evidence in establishing a correct diagnosis. It is, of course, necessary to differentiate an organic from the function murmur that so often develops in the course of disease.

A very common misunderstanding on the part of those less experienced in heart disease is to give too much importance to the loudness of the murmur, that is when it is loudest, taking it as definite evidence that the heart condition is worse. As a matter of fact the faintness of the sound may be due to muscular weakness and as the heart compensates and functions with more force the murmur becomes louder.

Circulatory Embarassment. Sooner or later in the severe cases evidences of circulatory embarassment usually develop, prominent among these being dyspnoea, cyanosis, edema and enlargement of the liver. They are rather grave from a prognostic standpoint.

Embolism. This is one of the most dreaded of the complications of endocarditis, particularly in the septic type. The effects will depend upon the site of lodgment of the embolus; for example, if in the brain, the lungs or the extremities, there will be evidence of circulatory impairment in the area involved, and often the development of an infectious process at that site.

Laboratory Findings. These will be governed largely by the preceding condition of which the endocarditis is a part.

There is usually a tendency to albumin and casts in the urine. At times there may be no abnormality found. In the case of embolic lodgment in the kidney, particularly if septic in character, there may be marked evidence of renal damage.

The most valuable diagnostic evidence is the finding of infectious organisms by blood culture, not only to establish a diagnosis of endocarditis, but to establish the bacteriological type. There is usually high total white and neutrophile counts. There is a tendency also to anemia, which sometimes is quite severe and rapid in development.

Differential Diagnosis.—This is sometimes exceedingly difficult. The principal conditions from which the disease must be differentiated are typhoid fever, tuberculosis, malaria, goitre, meningitis and foci of infection elsewhere in the body. A differential diagnosis is established in most cases by careful observation and the proper evaluation of all available data, obtained by repeated physical examinations and laboratory investigation.

Prophylaxis.—This naturally goes back to the prevention of or proper attention to those conditions that are known to figure in the etiology of endocarditis. It is important in treating these to keep in mind the possibility of heart involvement so as to make the necessary investigations and establish the proper measures of management.

Treatment. General Statement.—The first essential of treatment is attention to the causative condition if such can be determined. The mistake that is often indulged in here is supposing that the removal of a cause will cure the condition. I have found it of advantage in teaching to use the illustration that if a lighted torch has been thrown into combustible material, the first essential is to put out the torch; but that will not stop the conflagration it has started. On the other hand, it is folly to try to stop the conflagration while the torch is still ready to start up the trouble again. For example, if diseased tonsils have been the cause, they should receive prompt attention and removal, if the patient's condition will justify it. But even the removal of the tonsils will leave the morbid process in the heart still operative.

From the standpoint of treatment, endocarditis can be roughly divided into two groups.

First, those cases where the causative condition cannot be located or can be easily removed, or is relatively immaterial.

Second, those cases that occur during the progress of some other serious condition, as pneumonia or meningitis. In this last group the treatment of the heart naturally has to be materially influenced by the condition of the patient otherwise.

General Care.—There are certain general principles that may apply here though, of course, in a large measure the management of the case is influenced by the degree of involvement of the heart and the general condition of the patient.

Rest. All cases of acute endocarditis require absolute rest in bed; there is probably no other condition that requires rest to the same degree of completeness. These patients should not even be allowed to turn themselves in bed, but should be moved by the nurse. Liquids should be taken through a bent tube so that the patient will not have to raise his head. Not only should an effort be made to secure complete physical rest, but it must be borne in mind by the attendants that any factor that would cause the heart to beat faster or stronger is to be carefully avoided. This would naturally exclude all business or domestic cares or anything even bordering on unpleasantness. The treatment should be carried out in such a way as to avoid antagonizing the patient, and all measures that arouse resentment, particularly in children, should be omitted unless they are necessary. Company, talking or even reading or music which might have a disturbing influence must be prohibited.

Where absolute rest is to be enforced, it naturally obtains that treatment quarters must be selected with care. The room should be one in which isolation can be carried out as far as possible, one that is free of noises from the street, as these not only may disturb sleep but may be a source of irritation during the waking hours. The room should be selected also from the standpoints of light, ventilation and heating.

The patient should be kept comfortable, probably the term "comfortably warm" would apply in most cases. There should be enough warmth to prevent chilling of the surface and not enough to cause any possible discomfort which might contribute to restlessness and do more damage than it could possibly do good. The comfort of the patient is all-important; it is not advisable, therefore, to follow the instructions sometimes given to have the patient wear woolen clothes and covered with blankets. These matters should depend largely upon the conditions as previously suggested.

The duration of absolute rest is a matter of dispute. Many physicians still favor keeping the patient in bed for a period of something like a year, no matter what the progress. It would seem more reasonable to individualize and, while no definite statement can be made, it is probable that requirements are met by keeping the average case in bed for about four weeks after the temperature has gone to a permanent normal and the other clinical evidences have subsided.

Nursing. Good nursing is a matter of primary importance. There are several considerations that must be met. The nurse must be sufficiently capable to correctly judge the patient's condition, particularly from the standpoint of pulse and respiration. It is desirable also to have one who can carry out the measures of treatment without arousing antagonism. A good plan is to have on these cases nurses with the greatest amount of diplomacy and, where they are not able to secure the full cooperation of the patient, to change promptly, having this understood with the nurse in advance. When it is necessary to rely on members of the family, the physician's work is naturally increased.

Bathing. Sponge baths should be used exclusively. They should be of a temperature that is most acceptable to the patient. Warm water is most desirable.

Massage should not be employed as there is always a chance of embolism or foci of infection elsewhere in the body and serious damage may result.

Other Care. When the temperature is sufficiently high, an ice-bag may be used to the head, and very often an ice bag to the precordia is of benefit. A hot water bottle or electric pad or other devices may be employed.

The mouth should be kept scrupulously clean, but without unnecessarily disturbing the patient.

The Bowels. The bowels should receive careful and constant attention. There are few things more undesirable than abdominal distention. Not only does this lead to absorption of toxic material, but, through the ensuing discomfort, it contributes to restlessness and, by interference with the function of the diaphragm, it increases the respiratory rate, increases the heart rate and, therefore, increases the strain on the damaged organ that every effort should be made to protect. It is naturally inadvisable to drastically purge these patients. The effort should be made to promote mild elimination with the least amount of discomfort or interference with the patient's well-being. Probably liquid petrolatum is the most desirable agent. In some cases olive oil or cascara may be used. Enemas are of particular advantage when the other laxative measures fail to produce satisfactory results. In the matter of a laxative, we can very often be guided by the past experience of the patient. Often a drug that will act well in one case may cause considerable inconvenience or fail otherwise to meet the requirements in another.

Diet.—For the acutely sick patient, particularly with high temperature, very little in the way of food is indicated. Such articles may be used as diluted fruit juices (with milk sugar), malted milk or similar preparations (made up with water), and strained soups or cereal broths. As there is a pronounced tendency to anemia and exhaustion in this disease, it is desirable to increase the caloric intake as rapidly as conditions will permit. We must be guided not only by the temperature but by the gastro-intestinal condition, particularly the digestive ability as judged by a careful investigation of the patient's present and past. After the acute stage of high temperature has passed, many do well on a diet consisting largely of milk. Among the other articles that can be added are strained milk soups (made with one-half milk and some cereal), buttermilk, gelatin, custard, and well cooked cereals. This diet may be further increased as conditions improve. One of the main considerations is the avoidance of abdominal distention, and this phase of the patient's condition should be carefully watched. Water as such or in the form of diluted fruit juices should be given freely throughout the course of the disease unless contra-indicated.

General Medication.—There is very little in the way of routine medication to be recommended. Most of the drugs in materia medica have been used at one time or another. If a remedy does not do good, the possibility of its doing damage must be considered. It has been the custom for a long time to use the salicylates and in some cases they have a distinct value. In the endocarditis resulting from or associated with tonsillitis, rheumatic fever or chorea, theoretically, at least, the salicylates should be almost specific, and they should be employed in all cases of this type. They are used here just as in the treatment of acute rheumatic fever (see page 279). In other types of endocarditis, salicylates may be tried with due caution.

The effect on the gastro-intestinal tract and on the kidneys should be carefully watched. In any event the salicylates should not be persisted in, if they do not produce results or if the benefit seems to be more than counter-balanced by the gastric disturbance or renal irritation. The chances of unfavorable effects are certainly materially diminished by the intelligent employment of sodium bicarbonate.

Intravenous medication is frequently employed, the agents used being arsphenamine, sodium cacodylate, mercurochrome, neutral acriflavine, quinine, the salicylates and others.

Transfusion has been extensively used, but the same objections apply here as to the use of serums and other heroic measures. A seriously ill patient may be robbed of a meager chance of recovery by the shock or the reaction due to the treatment.

Vaccines and Serums. The same uncertainty as to the value of this type of treatment exists in endocarditis as it does in many other diseases. It is probable that in the acute stage vaccines are contra-indicated or, if used at all, they should be employed in very small doses and the effect carefully watched. In the subacute or chronic type of the disease they may have a distinct value in some cases. The autogenous vaccines would certainly seem to be most desirable. Where the organisms can be obtained from blood culture, the value would be even more certain. Where they cannot be secured in this way, the vaccine is best made from organisms taken from the supposed primary source of trouble (as diseased tonsils). Stock vaccines, of course, have been extensively employed and may have some direct or indirect value. Serums are highly recommended by many competent clinicians.

Symptomatic Treatment.—While many symptoms may require treatment, we will discuss only those most commonly encountered.

Cardiac Insufficiency. The chances of the development of this condition, which is one of the possibilities most to be dreaded, is greatly reduced by measures looking toward the general welfare of the patient, such as rest, attention to the bowels and careful diet. Much damage has possibly been done in these cases by the excessive use of stimulants. While a certain amount of stimulation may be desirable, it is difficult to gauge the exact requirement or to limit the action to the desired point. The old familiar illustration of whipping up a sick horse has been overworked, but it is certainly worthy of consideration.

Digitalis is the most valuable agent. The unfortunate tendency on the part of some physicians is to overlook the fact that digitalis is of value only in combating cardiac insufficiency and, as far as the disease process of the endocardium and valves are concerned, it may do more harm than good. Therefore when digitalis is used for failing compensation, it has to be employed in spite of this other possibility. It probably should be used in the smallest doses that will meet requirements. The concensus of medical opinion is in favor of doses of from 5 to 15 minims (0.3 to 1 cc.). For an emergency digitalis may be used hypodermically or intravenously. It may be employed in this way when for any reason it is inadvisable to give by mouth. The great majority of cases, particularly the mild types, will not require any stimulant whatever, therefore, the routine use of this drug is not recommended

Other Agents. Among the other agents that have been recommended are aromatic spirits of ammonia by mouth; camphor, in the form of camphorated oil by needle; strychnine, caffeine and atropine.

Pain. This disease is not often characterized by much pain. When it does develop, it calls for particular care in the general management. Precordial discomfort is often relieved by the application of an ice bag. When medication is necessary, codeine by mouth or needle is the most valuable agent. Sometimes morphine is necessary, but should be used with extreme caution.

Anemia. As previously states, there is a marked tendency to anemia. This, naturally, calls for the use of iron in some form. Many prefer the solution of iron and ammonium acetate. Pills of ferrous carbonate are also extensively employed. During convalescence, iron may often be associated to advantage with arsenic or bitter tonics.

Convalescence.—There are few conditions calling for more intensive care than endocarditis, and it is only by careful and continuous observation that the amount of damage can be estimated.

The tendency to recurrence should always be borne in mind and the patient guarded against any factor that might lead to this possibility. The resumption of activity should be gradual and carefully supervised, and any physical or mental strain avoided for a period of at least many months.

Complications and Sequelæ.—One of the most dreaded of these is chronic heart disease. This will be discussed in a separate article. Throughout the progress of the disease, the patient is particularly prone to such complications as pleurisy, inflammation of the liver, or, in fact, damage to almost any part of the body. Should these develop they should be treated very much as the same conditions arising from any other cause.

ACUTE PERICARDITIS

General Statement. Definition.—Pericarditis is an inflammatory involvement of the pericardium. Naturally other structures are invaded to a greater or lesser extent; just as in the discussion of endocarditis the statement was made that the myocardium usually participated in the disease process. Several definite types of this disease are recognized.

First. Acute pericarditis, this may be with or without effusion. In the so-called dry pericarditis, there is always some fibrinous exudate. If serous fluid develops, the condition is referred to as serous pericarditis, or if it contains pus, as purulent pericarditis; both of these conditions being known also as pericarditis with effusion. Subdivisions, as seropurulent and serofibrinous pericarditis are sometimes mentioned; these are different stages of the same process. Of course, many cases do not go on to the stage of appreciable exudation.

Second. Chronic adhesive pericarditis, this is a late stage of some form of the acute process.

Other types of involvement are hydropericardium, hematopericardium and pneumopericardium. Pericarditis is also classified according to the infecting organism, as streptococcal, pneumococcal etc.

Incidence.—This is essentially a disease of youth and middle life. While old age is not immune, the disease is much less frequent. No race or class is exempt. Men are somewhat more frequently affected than women. The etiology of the disease will indicate to a certain extent its incidence.

Etiology.—Among the most common causes are acute rheumatic fever, tonsillitis, pneumonia, pleurisy, septicemia, endocarditis, the infectious fevers, as scarlatina and diphtheria, tuberculosis, and focal infections. The disease may be carried by the blood stream or result from direct extension. The bacteriology is indicated by these causative conditions.

Course and Prognosis.—In the rheumatic type, the prognosis is fairly good; in the others, it is less favorable. The tuberculous is almost always fatal. The prognosis depends largely upon the condition of the patient from other standpoints, as this process is almost always secondary to infection elsewhere in the body. For example, this condition developing from endocarditis, pneumonia, or septicemia, would naturally have a grave outlook. It is certain that the vast majority of cases of this disease are not recognized, as is well shown by the findings at autopsies where pericarditis had not been suspected.

Symptoms and Diagnosis.—As suggested in the preceding paragraph, it is probable that most cases are never recognized. They either subside without causing sufficient evidence to indicate their presence or, occurring during the course of some other condition, such as pneumonia, or endocarditis, the symptoms are masked by the associated disease. Under any circumstances it is highly desirable, both for prognosis and treatment, that a prompt diagnosis be made.

History. The most important factor here is the finding of some recent or present condition that is known to be a possible cause of pericarditis. Very suggestive is a change in the course of some infectious disease that cannot be otherwise accounted for. Often a patient who is convalescing apparently, begins to show unfavorable symptoms, which should cause pericarditis or some kindred condition to be suspected.

Onset. This may be sudden or gradual. As the condition is usually a part of some other disease, it is usually hard to recognize a definite beginning.

Fever. There is nothing definite in the febrile course. Where the condition arises during the course of some other febrile process, there is an accentuation of the temperature beyond what would otherwise be expected. It sometimes accounts for the return of fever in a convalescent patient.

Pulse. Where the effect on the pulse is not masked by some other condition, there is a tendency at first for the pulse to be faster and stronger, later to become weaker and show various deviations from the normal. This is particularly the case where effusion develops. There may be irregularity, and such phenomena as pulsus paradoxus.

Respiration. The rate is usually increased out of proportion to the temperature. Dyspnea is common and if effusion develops, this is quite marked.

Cough. There is usually a decided cough, which has a tendency to be a single effort, in contra-distinction to paroxysms or repeated efforts.

Cerebral Disturbances. Among these are a general sense of uneasiness, nervousness, insomnia, headache, and, in some instances, actual delirium.

Pain. There is usually headache and general body discomfort, such as might be expected from an acute febrile process. There may be a sense of oppression or constriction of the chest. Sometimes, particularly early in the disease, there is precordial pain that may be quite severe.

Gastro-intestinal Disturbances. There may be anorexia, nausea, vomiting, abdominal discomfort, or other evidences of disturbance, though there is nothing characteristic.

Local Evidences.—The only absolute diagnostic sign is in the friction rub sometimes heard in the region of the heart, this is usually a to and fro sound that has been described as grating or rasping. It bears some relation, though not always absolute, to the cardiac cycle. It may sometimes be accentuated by pressure with the stethoscope or by a change in the position of the patient.

The usual rate or rhythm may be disturbed in any one of a variety of ways.

There may or may not be tenderness over the pericardium.

Evidences of Fluid. The local pain usually subsides when fluid accumulates, just as it does in pleurisy. Dyspnea is sometimes present to a marked degree. The presence of fluid materially interferes with the heart action, giving rise to various evidences of disturbance. Dysphagia may be present though it is usually mild, and may sometimes be relieved by the patient bending forward. There may be noted an anxious expression, and at times more or less marked cyanosis. When pus is present, there may be edema of the surface in the precordia, particularly in children. There is a lessened cardiac impulse due to the presence of fluid, which may be accentuated by the patient's bending forward. There may be tenderness on palpation.

There is an increase in the area of cardiac dullness, this is rather pear shaped with the broad end below. The acute cardio-hepatic angle becomes more obtuse. There may be dullness posteriorly.

Laboratory. The laboratory shows nothing characteristic, the findings will depend upon the type of involvement and the associated condition.

X-ray. This is sometimes invaluable in establishing a diagnosis.

Aspiration. When there is sufficient evidence of fluid to justify the measure, aspiration should be resorted to. This will be discussed under the head of treatment.

Differential Diagnosis.—A careful evaluation of all the available data, as outlined in the preceding paragraphs, will usually enable one to establish a prompt diagnosis. The main difficulty arises in those cases where the heart involvement is a part of some other morbid process, when sometimes the diagnosis is only established by the course of the disease.

Prophylaxis.—This consists in the prevention of those conditions that are known to be etiological factors, such as rheumatic fever, septicemia and other infectious diseases, and careful attention to foci of infection in the body, such as diseased tonsils and teeth, also prompt treatment of these conditions when they do develop.

Treatment. General Statement. As this condition usually develops during the course of some other disease, it naturally results that treatment of the pericarditis will be modified largely by the condition of the patient otherwise, and very often even where the pericarditis is discovered, it may not cause sufficient disturbance to interrupt the treatment that is already under way.

General Care.—Absolute rest is necessary. This should be complete, not only physical, but mental. Every factor should be eliminated that would cause the heart to beat faster or harder. The position of the patient should be that which gives the greatest amount of comfort; this often requires his being propped up in bed. Treatment quarters should be such as to favor quiet, ventilation, heating, and convenience of nursing. Fresh air is a matter of much importance as one of the most common effects of the disease is dyspnea. Good nursing is also particularly necessary. It is hard to overestimate the soothing influence of competent attention. The nurse should be one who is able to judge of the character of the pulse and to meet emergencies. The bowels should receive careful attention. Intestinal elimination should be maintained, but active purging avoided. Tympanites is particularly undesirable, as an accumulation of gas in the abdomen further impairs the respiration and the action of the heart. If there be much temperature, an ice bag should be used to the head, and an ice bag to the precordia will often give considerable relief. Some have recommended heat, but cold seems to be the measure of common choice. The matter of clothing and covering should be adjusted to meet the requirements: "comfortably warm" is the ideal condition.

Diet.—During the febrile period no effort should be made to maintain a high caloric feeding. Where the condition persists, sufficient nutrition naturally becomes a factor of importance. The principal considerations, particularly at first, are to avoid distending the stomach, indigestion and tympanites. At first such foods may be used as diluted fruit juices with milk sugar; malted milk or similar preparations; and strained cereal broths and soups. As the temperature subsides, such articles may be added as milk, gelatin, custard, well-cooked cereals, potatoes and toast.

General Medication.—There is no specific medication directed particularly to the relief of pericardial involvement. Where the condition has resulted from rheumatic fever, the salicylates are naturally indicated (see rheumatic fever page 279).

Symptomatic Treatment. Pain. At times a hypodermic of morphine is necessary, though in the majority of cases codeine by needle or by mouth will meet the requirements with less in the way of unfavorable side effects. Proper rest and quiet, an ice bag to the precordia, and other measures as previously suggested, will usually be all that is necessary, as pain is not often a marked symptom in this condition.

Fever. The measures previously outlined will usually meet the requirements. These should include rest, quiet, proper elimination, use of the ice bag and careful diet. Sponging may be resorted to, if indicated.

Cerebral Phenomena. The restlessness, insomnia and related conditions usually require some treatment. In many cases the general care as previously outlined will meet the requirements. Codeine may be used to advantage at times. Barbital in three to five grain (0.2 to 0.3 Gm.) doses or bromides in fifteen to thirty grain (1 to 2 Gm.) doses may be used as required.

Cardiac Insufficiency. This condition must be met just as if occurring in the course of other diseases. See page 328.

Aspiration. This is, naturally, fraught with a certain amount of danger. If there be sufficient evidence of fluid, it should certainly be considered. If there is evidence that the effusion is purulent, aspiration should be promptly used. Otherwise we must be guided here, as in the case of pleurisy, by the effusion, that is, if the effusion is small in amount, the area of dullness should be carefully noted and, if it increases, aspiration should be done. If it is not increasing and there is no marked evidence of cardiac embarrassment, we are justified in waiting further developments. If the fluid is apparently being absorbed, interference is contraindicated. The trocar and cannula are preferable for the aspiration. The same outfit is used as for pleural effusion, (see page 124), except that a smaller instrument is employed. A trocar and cannula can be introduced with almost as much ease as a needle of sufficient size, and it certainly lessens the danger of the operation. Before introducing the instrument, every preparation should be made to remove the fluid if such is found. Local anesthesia should always be employed. The fluid must be removed slowly and the patient carefully watched for any unfavorable symptoms, should these develop, the operation must be promptly terminated. The site for puncture will depend largely upon the size of the accumulation and the individual characteristics of the chest. It should be made well within the area of dullness; usually the fourth or fifth interspace is the location of choice.

Surgery.—Resection is sometimes necessary, but should be done only for the removal of pus that cannot be evacuated by aspiration.

Convalescence.—This should be managed with particular care. As soon as practicable, the diet should be increased so as to improve the state of nutrition of the patient and increase resistance. The return to activity must be carefully supervised, as the extent of myocardial damage cannot be estimated with any degree of certainty.

Complications.—The principal complication to be dreaded here is chronic adhesive pericarditis, which will be discussed as a separate subject.

CHRONIC ADHESIVE PERICARDITIS

General Statement. **Definition.**—This is a condition in which the surfaces of the pericardium adhere to a greater or less extent. It is a late result of acute or chonic pericarditis.

Incidence and Etiology.—These are the same as for acute or chronic pericarditis, of which the condition is a result.

Course and Prognosis.—These are influenced largely by the other conditions present and by the extent of the damage. Many of these patients adjust themselves to the disability, while the lives of others are terminated through failing compensation or by sudden death.

Symptoms and Diagnosis.—The majority of cases are never recognized. The most important datum of diagnosis is a history of preceding attacks of acute pericarditis. Among the symptoms that aid in diagnosis are such as failing compensation, retraction of interspaces in the precordia and of the epigastric region with systole, deviation from normal of the veins of the neck, pulsus paradoxus, diastolic shock, increase in the area of cardiac dullness and fixation of the apex beat, irrespective of change in the position of the patient.

Prophylaxis.—This is naturally the same as the prophylaxis of acute pericarditis, for once this condition develops we have no measures that influence the formation of adhesions.

Treatment.—The treatment is entirely symptomatic. In the majority of cases there is nothing required other than for these patients to be under careful supervision, and care that their activities do not go beyond their capacity. Should failing compensation develop, it must be treated as the same condition arising from other causes.

Surgery.—Surgery has sometimes been resorted to.

HYDROPERICARDIUM

General Statement.—This is a condition characterized by the presence of serous fluid in the pericardial sac. It is found in cases of general edema as well as in certain diseases of the heart or kidneys. The symptoms and physical findings are practically the same as in the case of pericarditis with effusion, (see page 315).

Treatment.—The treatment is the treatment of the causative condition. Where the fluid results in sufficient embarrassment, aspiration may be employed as suggested in the treatment of pericarditis with effusion.

PNEUMOPERICARDIUM

General Statement. This is a condition characterized by the presence of air in the pericardial sac. As a rule fluid is present also. This is not a primary disease, and is usually rapidly fatal. As in the preceding conditions, treatment is symptomatic or surgical.

HEMOPERICARDIUM

General Statement. This is a condition characterized by the presence of blood in the pericardial sac, and usually results from such conditions as aneurysm or wounds. The treatment is entirely surgical, either aspiration or more radical measures being resorted to if any interference at all is indicated.

CHRONIC VALVULAR DISEASES OF THE HEART

General Statement. Definition.—There is often considerable confusion in the mind of the student about the conditions grouped under the head of chronic valvular disease of the heart. There is some difference of opinion among writers on the subject.

This article will include those heart conditions in which there is any valvular defect without the presence of an inflammatory process. It will, therefore, embrace those lesions resulting from acute and sub-acute endocarditis or any other factor that may produce valvular impairment. There are many cases in which an acute infection is superimposed on a chronic valvular disease. Cases of this kind would be considered as presenting both acute endocarditis and chronic valvular disease.

Probably the most satisfactory classification is that into mitral, aortic, pulmonary, and tricuspid, and each of these subdivided into stenosis and insufficiency; for example, mitral stenosis and mitral insufficiency, aortic stenosis and aortic insufficiency. In a large percentage of these cases more than one defect is present.

Incidence.—All races, classes, ages, and conditions are affected. It is natural, however, that the larger percentage of cases develop within those periods of life when the etiological factors are most active. This is very strikingly shown in Shattuck's arrangement of heart diseases, based on incidence and etiology.

1. Congenital—Most commonly discovered in early childhood.
2. Infectious—Most commonly discovered in youth.
3. Syphilitic—Most commonly discovered in middle life.
4. Degenerative—Most commonly discovered in old age.

It is natural also to suppose that a larger number of cases develop among persons of those classes that receive inadequate medical attention and are most exposed to the ravages of disease.

Etiology.—Statistics vary considerably but a fair average seems to be that about 60 per cent of the cases result from rheumatic fever, about 15 per cent from syphilis, about 15 per cent from arterio-renal diseases, and about 10 per cent from all other causes combined.

Course and Prognosis.—There are few conditions that present such a wide range and in which individualization is more important. The progress of the disease depends upon many factors, such as the cause, the valve or valves involved, the extent of the damage when the condition is recognized, and the opportunity to carry out proper treatment. The most important consideration is the condition of the myocardium. Damage once done can seldom be repaired, and the outlook depends largely upon the ability of the heart to adjust itself to the impairment. It is certainly a fact that great injustice has been done to many by imposing unnecessary restrictions when the valvular defects were not of a serious nature. It is not unusual in practice to find patients not only limiting their pleasure and usefulness, but living in the constant fear of sudden death or other disaster, because they have been told that they had heart disease, when a thorough investigation would demonstrate that the condition was insignificant, and the diagnosis had been based upon the finding of some slight murmur. On the other hand it is undoubtedly true that many are robbed of years of life by not having a disease of the heart recognized or a serious defect given sufficient care and attention. It is particularly necessary to give the patient all possible hope, but at the same time someone interested should have the true facts, so that should unfavorable conditions develop the physician may not be open to criticism from the standpoint of ignorance of the state of affairs.

Symptoms and Diagnosis.—It is hardly possible here to go into a detailed discussion of the symptoms and diagnosis of the various valvular defects. The subject is so extensive that it can be properly handled only in a monograph of considerable length. The effort will be made to call attention in a general way to those evidences of major importance in making a diagnosis or estimating the extent of damage.

In diagnosis and treatment we encounter cases in which a destructive process is still active, those in which there is only a valvular defect demanding attention, and those in which there is a valvular defect and some other disease, in which the heart condition is only a part of the general picture.

History. Of particular importance here is the investigation relative to those conditions that are known to be a cause of valvular disease, such as rheumatic fever, syphilis, or arteriorenal disease.

Consciousness of heart function. It has been said that "The consciousness of a physiological function is an indication of disease." This applies particularly to the heart. Palpitation or other heart action that the patient can recognize is often present.

Loss of Strength. Among the early symptoms there is often a loss of physical efficiency, particularly an inability to sustained effort. This usually progresses in direct ratio to the heart impairment.

Psychic changes such as mental depression, loss of memory, or lowered mental efficiency may be present. Also various nervous phenomena as nervousness, irritability, insomnia or disturbed sleep, and hysteria. In serious cases delirium is often a prominent symptom.

Pain and Discomfort. This may take the form of a dull discomfort in the sternal region, or more or less pain in the precordia, the shoulder and the arms (particularly the left). There may be cramps in the legs or abdominal distress. There is a tendency to a sense of oppression in the chest, particularly upon physical effort.

Vertigo and Syncope. These may be slight or quite pronounced; they may be more or less constant or rather infrequent.

Headache. This is a fairly constant symptom and at times is quite pronounced.

Digestive Disturbances. Disturbances such as anorexia, belching, dyspepsia, nausea, vomiting, or diarrhea are frequent.

Cough. In the earlier stages this is usually of a short, hacking character. Later in the disease when there is failing compensation, the cough may be quite pronounced and accompanied by profuse expectoration and even blood.

Hemorrhages. Hemorrhages, especially epitaxis, are sometimes frequent.

Respiratory Disturbances. There is a tendency to acute respiratory infections, particularly bronchitis. There may be a chronic bronchitis characterized by the tendency to exacerbation toward the end of the day. At times there are paroxysms of dyspnea frequently asthmatic in type, these are usually at night. Shortness of breath upon exertion is one of the most constant symptoms.

Objective Symptoms. Among these may be the following: Loss of weight; in the case of children faulty development; changes in the complexion, such as grayish or sallow color of the skin; evidence of anemia; in some cases cyanosis may be marked, also exophthalmos, clubbed fingers, capillary pulse, and edema. The slight edema of the early disease is more apt to begin in the feet and progress upward; this is more an evening edema in contra-distinction to the morning edema of nephritis. Later there may be such conditions as ascites and hydrothorax. There may be diffusion of the apical impulse, distended pulsating vessels particularly in the neck, enlarged heart, precordial thrills, changes in the heart sounds, particularly the development of the various murmurs, changes in the heart rate and rhythm, changes in the character and quality of the pulse (such as the water-hammer pulse), changes in the blood pressure; and acute decompensation with pulmonary edema.

Laboratory. The findings here are not characteristic. The blood may show anemia or a positive Wassermann reaction. The urine may show albumin and casts.

X-ray. This investigation may give much information of value as to the size and density of the heart and aorta.

Electrocardiograph. This constitutes one of the greatest advances in diagnostic procedure.

Prophylaxis.—This includes the prevention of those conditions that are known to be operative in the production of valvular disease, such as rheumatic fever and syphilis, also with the proper handling of such diseases when they do develop so as to limit the possibility of heart damage. Prophylaxis is particularly concerned with such things as the prompt and efficient attention to diseased tonsils and other foci of infection, also with proper rest and careful attention in the treatment of such diseases as rheumatic fever, diphtheria, and scarlet fever. Too much emphasis cannot be laid upon the necessity of careful and repeated examinations of the heart during the progress of any disease that might affect it. Another factor of importance, particularly in limiting the damage and avoiding tragic possibilities, is the routine examination of all persons but particularly of the young during the age of greater activity. Many children are allowed to do themselves irreparable injury by a failure to recognize and give proper attention to a damaged heart. One of the greatest sources of trouble is improper care, particularly insufficient rest, in the management of known endocarditis.

Treatment.—It should be understood that only a small portion of those with a heart murmur require any treatment. It is exceedingly common to find athletes, boiler-makers, mothers of large families and others leading active and useful lives, who have murmurs indicating organic damage, yet who suffer no inconvenience whatever. In the following pages the discussion is confined to those cases that require treatment.

In all phases of the diagnosis, prognosis and treatment of valvular disease it is necessary to bear in mind that the same condition that affected the valves also probably affected the myocardium. In the treatment of any particular case, many factors must be taken into consideration, such as the valves involved, the extent of the damage, whether other disease is present, and the extent to which the patient can cooperate in the necessary measures. Of primary importance is attention to the cause. The tendency to recurrence of acute infectious processes is well recognized; therefore, when it is learned, for example, that the disease results from rheumatic fever, every effort must be made to prevent a recurrence of this and thereby, limit the chances of further acute involvement of the heart. In case of syphilis, of course, the disease must receive immediate and thorough attention.

General Care.—This will depend entirely upon the various factors involved, such as the character and extent of the heart damage, and the general condition of the patient.

Rest. Heart disease usually demands at least a certain amount of rest. Depending upon conditions, this will vary from absolute rest in bed to merely a mild restriction of activity, such as the avoidance of violent physical strain. No definite rule can be laid down.

Failing compensation calls for absolute rest in bed. A recumbent position is usually most desirable, but many cases are more comfortable if some device is employed which will permit them to maintain a semi-recumbent posture. Very often in the severe cases they are practically unable to lie down. Under these circumstances they should be made as comfortable as possible in the position which seems to give the most relief. The Morris type of chair often meets the requirements well. Each case will have to be studied individually and the degree of restriction imposed that seems to give best results. These regulations usually have to be changed from time to time as the patient has periods of improvement or manifests evidences that indicate the necessity for a greater degree of rest.

Recreation. This is important from many standpoints, such as the mental effect on the patient, maintaining the general health, and adding to the pleasure and usefulness of life. For the cardiac patient the recreation should be prescribed so as to come within the individual's ability; the one who cannot play football may be able to play golf to advantage; the one who cannot ride a bicycle may be able to walk with benefit. This phase of the treatment is often given inadequate thought and attention.

Occupation. In many cases the patient with heart disease must still be a bread winner, and judgment must be exercised in giving advice along these lines. It is cruel to have one who must work to earn a livlihood for himself or others unnecessarily give up a remunerative vocation; it is equally unjust to allow him to do himself injury when competent advice might direct him into a more suitable line of activity. In the majority of cases the individual may carry on by simply making moderate changes in the day's routine.

For example, the housewife in a two-story home when stair climbing is inadvisable, might live comfortably on one floor. The business man who has one or more flights of stairs to climb to his office, may secure an office in a building with elevator facilities or one on the ground floor. The man whose work requires physical strain may secure an office position in the same line of endeavor. The professional man may depend more upon an assistant. In all cases unnecessary exercise, such as running for a street car, cranking an automobile, or any of those things that make violent demands upon the heart must be avoided. These patients often learn to carry on their normal activities and at the same time secure more time for rest.

Marriage and Child Bearing. This will depend, of course, upon the individual case. Many women rear large families without unusual inconvenience in spite of valvular defects. It is probable that more injustice has been done by advising against marriage and motherhood than by permitting it. Such cases should, of course, receive unusual attention during pregnancy and delivery. The physician should not lightly give advice in this matter and any statement made should be founded upon careful investigation and the proper evaluation of all available data.

Habits and Manner of Living. A careful, temperate, well-balanced life is always desirable or necessary. With a little care the patient can be taught what will make the heart beast faster or stronger, and these things should be avoided. This will include the correction of such faults as excessive use of tobacco or alcoholics, over-eating, excessive worry or anger, and all else that prevents a placid, normal existence. He should be taught to be a good sleeper; a comfortable bed and a well ventilated room are helpful.

Exposure. This should be avoided not only on account of the immediate effect but because the general health may be impaired or acute respiratory infections develop. These patients should be particularly careful about proper clothing and covering, and ventilation and heating both in their living and working quarters. Warm or tepid baths are desirable. Care should be exercised to prevent chilling either during or after bathing. For the bed case a warm sponge should be used.

Climate. There is no special climate that can be universally recommended. As a rule an equable climate, one that is free from sudden or excessive changes in temperature is best; high altitudes are usually unfavorable. In a general way the type of climate which lends itself to the best general health meets the requirements here.

Psychotherapy. This is a very important phase of the management of many cases. In the mild types, these patients should be so managed that they will not be subjected to unnecessary worry and unhappiness, and be able to enjoy life without living in the shadow of a constant dread of tragedy. It is not unusual to find patients with mild heart damage who have developed into typical neurasthenics. Peace of mind and contentment are enormous factors in prolonging life. Mental anxiety and worry affect the heart's action always, and by inducing a proper state of mind, the physician may reduce the number of heart beats many thousands per day.

General Medication.—There is no specific for chronic valvular disease as such, and the medication has to be adapted to the individual; with the exception of certain particular cases, it is almost entirely symptomatic.

Salicylates. These have been extensively employed and it is probable that their use originated from the fact that so many of these cases result from rheumatic fever in which salicylates are of particular value. It certainly seems reasonable to suppose that once the causative condition has subsided and we have to deal only with the resulting damage, that the salicylates would have no special value. In addition to this, it must be remembered that this group of drugs has a tendency to disturb the gastric function. In the process of symptomatic treatment, acetylsalicylic acid may be used as such to relieve pain, but not with any hope of benefit to the heart.

Iodides. In the case of syphilitic origin iodides are sometimes used with some degree of success. With high blood pressure, even when there is no evidence of syphilitic infection, the iodides are often of very material value. In these latter cases the tendency is to use the drug in small doses, a total of five to ten grains per day. They are probably best given at night, and in the majority of cases may be employed in this manner for an indefinite time. Many, of course, use much larger doses. Some give these cases mercury and iodides instead of iodides alone.

Anti-syphilitic Drugs. In cases giving positive Wassermann reactions, anti-syphilitic treatment should be promptly and thoroughly employed. Cases with a negative Wassermann and a negative history but showing the type of heart involvement most frequently resulting from syphilis, should be given the benefit of at least a modified specific treatment. In this latter group it is rather customary to omit arsphenamine and begin the so-called mixed treatment, being guided in the further management by the result of repeated blood examinations and the response to treatment.

Digitalis. There is great difference of opinion as to the value of digitalis in the routine treatment of valvular disease, and in the majority of cases it is not indicated. In the symptomatic treatment it has a field of usefulness. In a general way it may be said that digitalis is to be used in the case of the heart with valvular defects, when the indications arise, just as it would be given in the case without valvular defects. This will be discussed under the head of symptomatic treatment.

Symptomatic Treatment.—It is impossible to cover all of the symptoms that may arise in the course of handling a condition as protean in its manifestations as the one under discussion. Only those most commonly presented will be discussed.

Headache. This ranges from a dull discomfort to attacks of pain that may be acute and quite severe. The medication will depend upon the general condition of the patient; in the high pressure cases, particularly, acetylsalicylic acid is of value. Codeine alone or associated with acetylsalicylic acid is often used. These two drugs will meet the requirements in the majority of cases. This symptom will often respond to simple measures such as rest, proper elimination, and careful diet. The headache of this hypertensive group often may be controlled by the use of the iodides and other measures directed toward the reduction of pressure.

Chest Pains. These call for special efforts in the matter of general care. In the high pressure cases the patients should have their activities limited and all the other measures instituted to reduce the pressure toward normal. In the way of medication, codeine alone or with acetylsalicylic acid may be used for temporary relief. Many of these cases are benefited by the use of the iodides. The necessity for medication is often materially reduced not only by the employment of rest and such measures as previously outlined, but by local applications to the chest, as the hot water bottle, the electric pad, or the ice bag. Mustard poultices may be of benefit. This type of discomfort is often the result of gastric disturbances so special attention should be given to diet and elimination.

In attacks of true angina the pain may be so severe as to require hypodermics of morphine and no hesitation should be experienced in using it promptly. Nitroglycerin by needle or by mouth or amyl nitrite by inhalation will often give prompt relief. In many cases of cardiac pain the patient is in extremis, and succumbs in a short time; if the physician has administered a hypodermic of morphine and made no effort to prepare the family for the immediate possibilities he may be blamed with having hastened the patient's demise. It is best, therefore, when possible, to let the family know what the immediate future may hold, in assuming emergency care of one of these cases.

Leg Pains. These occur principally when the lower limbs are chilled and often respond to warmth. From the standpoint of medication, those recommended for the relief of other types of pain may be used here.

Cough. The various types of cough will require treatment adapted to the particular case; for example, the short hacking cough that is experienced by many with a premature contraction requires no treatment except the relief of the heart condition. The cough from bronchitis should be treated largely as would the same condition arising from other causes, the main difference being that it is particularly desirable to save the heart unnecessary strain; therefore, prompt efforts should be made to limit the non-productive cough. The cough of pulmonary edema requires no treatment other than the relief of the causative condition. In all of these cases the patient should have the benefit of instructions in the matter of suppressing unnecessary coughing, and also the advantage of all phases of general care. For the immediate relief of paroxysms, codeine is probably the most satisfactory agent. It should be used in whatever amount is found to be necessary to meet the particular requirements.

Dyspnea. The treatment of this condition is primarily the treatment of the heart. There are certain measures, however, that lend themselves to the lessening of this disturbing symptom. Among these are the limitation of exertion, the very sick cases, of course, should be put at absolute rest; all should avoid those things that produce dyspnea, such as exertion, dietary indiscretions, and impaired intestinal elimination. For the nocturnal paroxysms, asthmatic in type, morphine and atropine may be indicated; the belief is usually prompt and permanent so far as that night is concerned. Adrenalin may be tried cautiously providing it is not contra-indicated by the condition of the heart. It must be borne in mind that this drug in heart cases is usually contra-indicated, and it has been claimed that where the paroxysms respond to adrenalin it is true spasmodic asthma and not cardiac dyspnea. Where the condition is supposed to be of cardiac origin, the drug should be used only by a physician, in very small doses, and the patient kept under observation for at least twenty to thirty minutes. The marked dyspnea of pulmonary edema will be discussed under the head of that particular condition. Many high pressure cases present a tendency to chronic dyspnea which subsides on the use of iodides.

Anorexia. This is best controlled by the general care of the patient, as rest, outdoor recreation, where the condition of the patient will permit, cheerful surroundings, carefully prepared and attractively served meals, and psychotherapy to bring about a cheerful frame of mind. Proper elimination will naturally be of importance. Simple bitter tonics may be tried, though their value is questionable.

Dyspepsia. While this is here a symptom of the heart condition and due to circulatory disturbance, it may be much modified by proper attention. The first consideration is to determine the actual status of the digestive function, as a patient with heart disease may, have any type of stomach trouble, and in fact is more apt to have such than the patient with a normal heart. Such conditions as hyperchlorhydria or hypochlorhydria will naturally be treated much as if arising from any other cause, the only difference being that these cases require more careful attention. It must be borne in mind not only that the heart may cause gastric disturbances, but also that gastric disturbances may impair the heart function. In all cases particular attention should be given to the diet. Patients showing faulty digestion should be given a written diet list with written instructions as to manner of eating and any other necessary information.

Vomiting. This may be from simple indigestion, in which case it is relieved by proper attention to the gastric condition. In the later stages of heart disease particularly, vomiting may be more directly a result of the circulatory condition, and the principal element in relief will, therefore, be attention to the primary cause.

The bromides are probably the most satisfactory antinauseants. In acute dilation of the stomach, use of the stomach pump may be indicated.

Hiccough. This is not a very common symptom, but is one that may materially add to the burden of a distressed circulatory apparatus. Measures such as careful diet and proper elimination are of value. The bromides and alkalies may contribute to relief.

Constipation. Particular care should be given to elimination, but violent purgation is to be avoided. Some cases, call for active purgation but this is to meet an emergency. As a rule constipation should be prevented by the simple measures of habit, laxative diet, and olive oil or liquid petrolatum.

Edema. This is often a fair index to the general condition of the patient. The essential factor in the management is attention to the circulatory apparatus. The presence of edema usually calls for more rest and in many cases this is all that is required.

There are some patients who must continue their activities as bread winners yet who show at times, or constantly, a slight afternoon edema of the lower extremities, upon whom it may be inadvisable to impose any large amount of restrictions. Marked edema or edema associated with other unfavorable developments naturally calls for rest of sufficient completeness and duration as to meet the requirements of the case. These matters will be discussed in detail under the head of cardiac insufficiency.

Ascites, hydrothorax or other accumulations may require removal by aspiration or tapping. In many cases these measures not only relieve the discomfort due to the presence of fluid but seem to react favorably upon the general condition. In all cases of edema careful investigation of the renal function should be made. The management of edema will be discussed further under cardiac insufficiency.

Nervous Phenomena. Various manifestations such as nervousness, irritability, insomnia, and mental depression may require attention. As many of these cases are naturally of a fundamentally nervous temperament the disposition of the individual should be investigated and given due consideration. The essential factors of treatment are included under general management. For example, a patient with a tendency to irritability should avoid, as far as possible, those conditions that irritate and should be schooled in the proper efforts at self-control; the patient with a tendency to insomnia should be given every opportunity to sleep and instructed in the art of securing sleep. Also of primary importance is the attention to the cardiac condition. For example, high pressure cases or the case with cardiac pain may lose many or all of these nervous phenomena when the pressure is reduced or the pain relieved. The rest treatment is often of unlimited advantage. Hydrotherapy may be all that is required to secure relief. In many instances it is necessary to revise the living conditions so as to provide more recreation and mental relaxation. In all instance, proper attention should be given to diet and elimination.

Psychotherapy is the sheet-anchor of treatment in some cases. The whole problem is often solved if the patient can be given sufficient hope and confidence as to the future. Irritating or alarming symptoms may often be explained away and forgotten.

In the way of medication the bromides properly used are among the most valuable agents. Luminal in small doses may be employed. Barbital may be used in doses of from 2 to 5 grains (0.13 to 0.3 Gm.).

Anemia. The tendency to anemia should be combated by the use of fresh air, proper diet, and the various other measures directed to the general health. When the condition develops, the same therapeutic measures may be instituted as for anemia developing from other causes. Iron alone or in combination with other agents may be used; the results are often disappointing.

Acute Infections. Special attention should be given to the management of acute infections, as a condition that might be almost negligible to the average patient may be quite serious with the heart case. These patients seem to have a particular tendency to bronchitis, and acute respiratory infections should be avoided by all known means and should they develop, be given prompt attention and the patient kept under close observation for unfavorable complications, particularly pneumonia.

Cardiac Insufficiency. Failing Compensation. This condition is watched for and dreaded from the beginning of heart disease, it may appear only after the duration of many years or not at all. It is usually evidenced by edema or dyspnea or the developing or accentuation of any one of a great number of symptoms that call for more intensive attention. The details of the management depend largely upon the degree of circulatory impairment and the general condition of the patient. The first consideration is rest, and usually this should be absolute and of sufficient duration to meet the requirements. Particular attention should be given to diet, elimination, and the various other factors of general care. It is here that digitalis may be distinctly indicated. Its use will, of course, depend upon the proper evaluation of all available clinical evidence, as will be discussed under treatment of acute decompensation. Failing compensation certainly calls for a readjustment of the future life of the patient, the extent of this readjustment depending upon the requirements of each particular case.

Decompensation. This is evidenced by such signs and symptoms as dyspnea, pulmonary edema, and general edema. The heart may show any one of a great variety of changes in rate, rhythm, or force.

The following outline which is condensed from Shattuck can hardly be improved upon.

(*a*) Rest.
(*b*) Depletion
    1. Purgation.
    2. Limitation of liquids (and salt).
    3. Diuresis.
    4. Venesection.
    5. Leeching.
    6. Tapping.
(*c*) Stimulation.
(*d*) Diet.
(*e*) Regulation of Mode of Life.

Rest should be as complete as possible and in a recumbent or semi-recumbent position. In some cases the patient seems entirely unable to lie down and will have to sit up. This may be arranged for in bed (preferably) or a chair, the Morris type of chair is well adapted to this use. Comfort is an important consideration. The rest should be mental and physical, all company excluded and only those in attendance who are absolutely necessary for the management of the case. The members of the family who are not assisting in the care of the patient should limit their visits and be instructed as to their conduct while in the sickroom. The duration of rest must depend upon the condition of the patient. It should continue at least for several days after the major symptoms have subsided. In the very sick case with pulmonary edema and marked dyspnea, and more particularly where the patient is much excited, a hypodermic of morphine and atropine may give excellent results. The effect of this is sometimes quite spectacular and in many emergencies it meets the major part of the immediate requirements. In all of these cases, particularly during the period of intensive treatment, sufficient sleep must be secured.

Depletion. The extent to which this is indicated will depend upon the conditions presented by the particular case. The measures that may be employed are purgation, diuresis, diaphoresis, limitation of fluids, limitation of salt, and occasionally venesection or aspiration.

Purgation. It is usually undesirable to purge these patients violently and in many instances the matter of rest may be such a factor that it is inadvisable to give any purgative at all in the beginning of treatment. Where purgation is used many prefer a preliminary dose of calomel and to maintain elimination with salines. In the majority of cases it is probably advisable to use some simple saline, such as magnesium sulphate, in sufficient amount to maintain a mild hydrogogue effect without disturbing the patient to too great an extent. In selected cases purgatives may be supplemented to advantage by the use of enemas.

Diuresis. If the renal elimination is fairly well maintained the use of diuretics is unnecessary, but where it is indicated, probably the most satisfactory is theobromine sodio-salicylate in about fifteen grain (1 gm.) doses, repeated every few hours until the necessary results have been obtained. Many other diuretics have been suggested. Where digitalis is used, it will often meet all the requirements from this standpoint.

Diaphoresis. The majority of these patients are not favorable for drastic sweating. In selected cases the hot pack or the use of the electric hood will be indicated. In most instances the best results are obtained by maintaining sufficient warmth to keep up a modified skin activity, and this may be produced by the use of hot water bottles to the feet and knees, and sufficient covering. The comfort of the patient is a matter of paramount importance, and measures which cause discomfort or meet with resistance should be abandoned. Under all circumstances it is necessary to prevent chilling of the surface of the body.

Limitation of Liquids and Salt. This is employed in the effort to relieve edema. It is seldom if ever advisable to reduce the total liquids below 1 pint (500 cc.). Usually a reduction to 2 or 3 pints (1000 to 1500 cc.) will give all results obtainable by this measure. A "salt-poor" diet rather than a "salt-free" one seems most satisfactory.

Venesection. It is rather rare that this measure is indicated. In some cases it is certainly a life-saving process. It should be undertaken only with a due consideration of all the available evidence and, where there is any doubt, it is probably better to omit the measure entirely. When the withdrawal of blood does seem to be indicated, it usually can be best accomplished by the use of a proper needle and syringe. The amount removed should depend upon the condition of the patient and the reaction during the process.

Aspiration, Tapping and Leeching. Aspiration of pleural fluid or the removal of ascitic fluid by tapping are frequently indicated. The benefit is direct and indirect. Leeches are seldom if ever indicated.

Stimulation. Many drugs are used such as strychnine, camphor, caffeine, and ammonia. Where a preliminary hypodermic of morphine and atropine is used, a certain amount of benefit is obtained in this particular, as well as in quieting the patient. Digitalis is the drug of major importance, and is used in several ways. Some give comparatively small doses and continue the use in this way until results are obtained. Others begin with a comparatively small dose and increase until results are obtained. In the majority of cases the best results are obtained by giving large doses until the physiological effect of the drug is developed. The plan that has been worked out so thoroughly by such competent observers as Eggleston, Halsey, Hatcher and others is as follows: To meet the average conditions in the average case, 1 fluidrachm (4 cc.) of a properly prepared tincture is used for every thirty pounds of body weight, the total to be given in the course of about forty eight hours. In estimating the body weight allowance must be made for edema. By this plan a patient of one hundred and fifty pounds (about 70 kilo) should be given five fluidrachms (20 cc.)

of the tincture. There is considerable difference of opinion as to the details, in the size of dose and frequency of administration. A fairly common custom is to give three fluidrachms (12 cc.) in the first twenty-four hours and two in the second; or two fluidrachms (8 cc.) in the first twenty-four hours, two the second and one the third. Another plan that has some advantage in selected cases is to give a fluidrachm every eight hours until the desired effects have been produced, toxic symptoms have developed, or it has been demonstrated that the drug will not meet the requirements. It should be remembered that, while the drug is being used in this way, the patient should be at rest and under the frequent observation of the physician. It is best that the patient be seen by the physician before every dose, if it is being given every eight hours. Many have urged the value of proper elimination in securing the effect of digitalis, also the advantage of the removal of any large accumulation of fluid such as ascites, or hydrothorax. When the physiological effect has been produced, the digitalis may be continued in a maintenance dose. The average is calculated as about 20 minims (1.3 cc.) per day. Digitalis by mouth is slower in action and in emergency it is often advisable to use some special preparation by vein. Strophanthin may be given intravenously. A consideration of importance in the intravenous use of digitalis is that of whether the patient has recently had the drug in sufficient amount to constitute a factor from the standpoint of toxicity. In the matter of preparations of digitalis for administration by mouth various ones have been recommended. The concensus of opinion is in favor of the standardized fat-free tincture such as is put out by most of the larger pharmaceutical houses and if there is any doubt about a druggist having it in stock, this information can be readily obtained by consulting the store to which the prescription is to be taken. Many have advocated the use of the infusion or the leaves, the main objection here is the difficulty in obtaining a standardized product. In order to ascertain the local conditions in New Orleans, I personally investigated the stock of a number of first-class drug stores, and in no instance was I able to obtain standardized leaves (or any which could be used as such) or from which a standardized infusion could be made. It is probable that the same condition obtains in most other communities.

Diet.—This will, of course, depend upon the condition of the patient. During the first twenty-four hours of acute decompensation, it is advisable to give nothing at all in the way of nourishment and after this the diet will be largely dictated by the progress of the case. The consideration here is not only the condition of the heart but the state of nutrition. The patient that is full weight or over may well afford to lose, while one who is already much below standard should be made to maintain proper nutrition if possible. We must be guided also by the condition of the kidneys and the known digestive peculiarities of the individual. In any event the diet should be simple, easily digested, and of a type that does not lend itself to the production of flatulence. It is better to give small feedings at frequent intervals. The amount of fluids must depend largely upon the ability of the patient to handle them, considering particularly the presence of edema. As a rule, with edema, the diet should be largely of a dry type, such as toast, well-cooked cereals, and creamed potatoes, to these may be added a certain amount of milk, buttermilk, malted milk, or other liquids depending upon the total fluids allowed. As the condition of the patient improves the diet should be increased, being guided by a careful evaluation of the various factors to be considered.

After-care. Once a patient has shown acute decompensation a recurrence is always a possibility, and instructions should be given as to the measures to take should the emergency arise. It is one of those conditions in which time is often of vital importance and a few minutes may at times mean life or death. It is sometimes advisable to give the family a list of physicians who might be readily available in case of an emergency, and to have an understanding with these doctors as to the case, so that if the regular attendant should not be immediately available, the patient would not be deprived of the advantage of prompt attention. After an acute attack the return to activity should be gradual and under careful observation. The patient should be instructed in the manner of right living from all standpoints that will tend to prevent the development of a recurrence.

Complications.—The many complications that are possible in the course of chronic valvular diseases of the heart must be met much as the same conditions arising under other circumstances. These will be considered under the appropriate heads.

MYOCARDITIS

General Statement. Definition.—Myocarditis is a term used to cover all of those conditions characterized by impairment of the heart muscle. It includes both the acute process and that which is chronic in character. The term also embraces inflammation and degeneration both of the muscle structure direct and when due to changes in the connective tissue. In many instances the impairment has not been confined to the muscles alone, but has involved the valves and the nerve mechanism.

Incidence.—This naturally runs parallel to the various conditions involved as etiological factors, as will be noted in the succeeding paragraphs. It is naturally much more common in adult life, and in those groups that are subjected to unfavorable living conditions, to the ravages of dissipation, to insufficient medical attention, and to poor personal care.

Etiology.—This embraces so wide a scope that it covers practically the entire field of disease and most other conditions that unfavorably influence well-being.

Acute Myocarditis. Among the most common causes are infections, particularly rheumatic fever, diphtheria, scarlatina, influenza, pneumonia, and syphilis. These may involve the heart muscle directly or indirectly. The degenerative lesions may result from the conditions just mentioned, and also from such factors as tuberculosis, intestinal intoxication, and foci of infection as in the teeth, gums, tonsils, gall bladder, and genitourinary system.

Chronic Myocarditis. This may result as an end stage of acute myocarditis from any cause. In fact, it is probable that a large part of the chronic cases develop in this way. Chronic foci of infection are a frequent cause of myocardial damage and may act either directly or indirectly. Among other causes are intestinal toxemia; chronic kidney disease; arteriosclerosis (particularly damage to the coronary vessels); endocrine dyscrasias (particularly thyroid involvement); alcoholism; excessive use of tobacco; and sustained physical effort. In fact, it may be said in a general way that the chronic process may result not only from one massive injury, but also from "repeated small insults."

Course and Prognosis.—This depends largely upon the cause and the promptness and completeness with which it may be removed, the condition of the patient and the extent to which cooperation can be secured, and some other factors that will be mentioned in the section on treatment.

Acute myocarditis occuring in the course of an acute disease usually carries an unfavorable prognosis. The chronic process presents a more favorable outlook. It must be remembered that the damage once done is usually beyond repair and that the outcome must depend, therefore, upon the arresting of the destructive process while there is still sufficient heart muscle to meet the body requirements. This includes being able to reduce the requirements or the activities of the individual patient to within the restricted ability of the damaged heart.

Symptoms and Diagnosis. Acute Myocarditis.—Often the myocardial process may be masked by the causative or associated conditions. This is particularly true in acute diseases. Valvular insufficiency or impaired innervation may complicate the picture.

History. There is usually the history of some previous disease that is known to be a possible etiological factor, such as rheumatic fever, scarletina, diphtheria, or influenza. Usually the evidences of damage to the patient were beyond what might have been expected from the primary disease or, as the primary disease subsided, the individual failed to return to normal.

Onset. As suggested in the preceding paragraph, the symptoms of the beginning of the myocardial process are usually merged with those of the primary disease.

Circulatory Symptoms. The pulse rate is usually increased, there may be any one of the various arythmias and later all of the phenomena of cardiac insufficiency. Edema or cyanosis are among the first evidences of failing compensation. There may be considerable enlargement of the heart.

Respiration. The respiratory rate is usually increased out of proportion to the temperature but maintains its relation to the pulse rate. There may be marked dyspnea, which at times is paroxysmal in character.

Temperature. In the inflammatory process the heart involvement contributes to increasing the temperature elevation.

Weakness. This is one of the most constant symptoms, sometimes the first one that calls attention to the fact that all is not well.

Nervous Phenomena. There may be restlessness, irritability, insomnia or even delirium, convulsions, or coma.

Gastro-intestinal Symptoms. Anorexia is rather the rule. There may be nausea and vomiting.

Skin. There may be pallor or cyanosis. There is a marked tendency to sweating and coldness of the extremities.

Pain. There may be headache or general body pains, and although more or less angina is a characteristic symptom, it is by no means constantly present.

Laboratory. The inflammatory process naturally tends to cause an increased total white count and a relative increase in the neutrophiles. If the process be protracted, there is usually anemia.

The urine may show evidence of renal irritation, though there is nothing characteristic. The degenerative process may give no laboratory findings of value.

The electrocardiograph and x-ray are invaluable aids in diagnosis.

Chronic Myocarditis.—When this is a continuation of the acute process, the history, onset, etc. are the same as that of the acute involvement, these may be perpetuated or exaggerated in the chronic stage. Where the case represents itself as a chronic myocarditis, the following signs and symptoms may be found:

History. There is usually the history of some etiological factor, such as acute myocarditis, a chronic focus of infection, or syphilis.

Onset. The onset is usually gradual, the patient probably noticing first an impaired physical efficiency, especially a shortness of breath upon exertion, such as climbing stairs. At times some sudden development, as an arhythmia, may call attention to the damage that the individual had not suspected.

Circulatory Symptoms. These may include one or more of such evidences as increased pulse rate, arhythmia, precordial pain upon exertion, or any of the other evidences of failing compensation, particularly afternoon edema beginning first in the lower extremities.

Respiration. The rate is usually increased, particularly upon exertion. There may be considerable dyspnea which may take the form of nocturnal paroxysms.

Nervous Phenomena. There is a marked tendency to impaired efficiency. There may be restlessness, and insomnia. There is a distinct tendency to psychoses which may take the form of delirium or mania.

Temperature. As a rule this is not materially affected.

Gastro-intestinal Symptoms. There may be anorexia; indigestion is quite common; and there is a decided tendency to flatulence and to constipation or diarrhea.

Pain. This may not be present at all or there may be any degree of angina pectoris.

Laboratory. There is a tendency to a secondary anemia and, sooner or later, to renal impairment.

Electrocardiograph and x-ray. These are almost invaluable as aids to correct diagnosis, not only as to myocarditis being present, but as to the extent of the damage.

Prophylaxis.—This includes not only the prevention of all those conditions known to result in heart damage and prompt attention to them should they develop, but proper care of the heart during the progress of such diseases. The safe-guarding of the heart muscle includes every factor concerned in correct living and the maintaining of a perfect state of well-being. It covers almost the entire field of life. Of particular importance is the removal of foci of infection and a sufficiently thorough treatment of rheumatic fever and of syphilis.

Treatment.—In either the acute or the chronic type of the disease, removal of the cause is the first consideration and often the major one. Not only this, but sufficient care must be taken to prevent the development or continuance of those conditions that might be contributing factors in perpetuating the cardiac embarassment. This includes especially constipation, alcoholism, and the excessive use of tobacco.

Acute Myocarditis. General Care.—When acute myocarditis develops, the patient is usually already under treatment for the primary disease. In any event it calls for absolute rest in bed. This rest should be both mental and physical and should include the elimination of every factor that might make the heart beat faster or with more force. Effort is centered on lessening the work of the heart by every available means. The patient should be in a comfortable, well ventilated room, free from noises. Company should be forbidden and all business and domestic cares eliminated. The duration of this regime depends upon the conditions found in the individual case. The mistake usually made is returning the individual to activity at too early a date. Where there is any uncertainty, the patient should have the benefit of the doubt in continued restrictions.

Diet. The diet must be regulated according to the various factors that are of most importance, such as the primary disease, the degree of circulatory embarrassment, the digestive ability, and the state of nutrition of the patient. It is best to give only enough food to meet the requirements, and this should be given in small feedings and at sufficiently frequent intervals. The food should be bland, nutritious, easily digested, and should carry a minimum amount of refuse. Alcoholics should be prohibited and caffeine-containing drinks reduced to a minimum at least.

Medication.—This must be influenced by the primary disease. For example, in the presence of rheumatic fever, the salicylates are indicated. In case of syphilis, the specific treatment should be carried out. There is no specific treatment for myocarditis as such.

Symptomatic Treatment.—This is directed by the condition that obtains in each particular case. Failing compensation, angina pectoris, or any one of the arhythmias, would call for treatment very much as would these conditions occurring from other causes.

Chronic Myocarditis. General Care.—Under practically all circumstances, some restriction of activity is necessary, the extent of which must depend upon the condition of the individual patient. If there be circulatory embarrassment, absolute rest in bed is indicated. The rest should be both mental and physical. The surroundings should be such as lend themselves to bodily comfort and peace of mind. The duration of the rest must be dictated by the progress of the case. The patient should have a daily cleansing bath and careful oral hygiene.

Diet. The diet must be governed by the various factors suggested under diet for acute myocarditis. Of importance here also is the matter of lightening the burden of the heart by reducing any overweight. The state of nutrition of the patient should be reduced to a moderately low normal, as every pound of unnecessary tissue requires porportionally unnecessary work on the part of an already damaged heart.

Exercise. It must be remembered that we are dealing with a distinctly chronic process, that the damage done is largely beyond repair, and that it is necessary in many instances to favor the adaptation of the damaged circulatory apparatus to the needs of the individual. It seems logical to suppose that the remaining heart muscle may be educated to an increased activity, just as may the muscle structure of other parts of the body. The return to activity, however, should be carefully supervised and the results noted. Violent exercise, of course, is indefinitely contraindicated. Some have recommended the use of hot or cold baths as the first step in exercising the heart muscle. Passive motion is also employed. When conditions justify it, walking gradually increased, is one of the most readily available and easily directed of any of the forms of activity.

Regulation of Life. The future outlook for the individual depends very largely upon the extent to which the various activities of his life may be adjusted to his circulatory possibilities. A certain amount of restriction is always necessary. Very often an individual can be an effective breadwinner even with considerable myocardial impairment. They must avoid always any condition that will make demands beyond their ability. One who has been accustomed to physical labor may take up some sedentary occupation. A physician may procure an assistant and give up night calls and confine himself largely to office or hospital practice. The minister may have an assistant to do a large part of the work of his parish. The business man may turn over many of the gruelling details of his affairs to his associates. Under all circumstances, dissipation of any kind must be avoided. This includes especially over-eating, the use of alcoholics and the excessive use of tobacco. Of particular advantage in the care of these cases is rest after meals and longer hours in bed at night.

General Medication.—There is no specific treatment.

Symptomatic Treatment.—Arhythmias, angina pectoris, failing compensation, high blood pressure, or other developments are handled as the same conditions arising from other causes.

Complications.—Myocarditis itself may be regarded as a complication and, therefore, the conditions usually classed as complications have been referred to in the preceding paragraphs. These have been discussed under their several different heads elsewhere, as indicated.

CARDIAC ARHYTHMIAS

General Statement. Definition and Classification.—The term cardiac arhythmias, or as it is frequently called cardiac irregularities, is used to describe those conditions in which there is a deviation from the regular, orderly movements of the heart. Recent investigations, particularly those of MacKenzie, Wenckebach and Thomas Lewis, have tended definitely to place these deviations from the normal into certain groups. Among those of material importance are:

1. Sinus Arhythmia
2. Heart Block
3. Premature Contractions (Ectopic beats or ventricular extrasystoles)
4. Simple Paroxysmal Tachycardia
5. Auricular Flutter
6. Auricular Fibrillation
7. Alternation of the Heart

There are other arhythmias observed in practice, but those of importance have been demonstrated to be really subdivisions of one or more of these seven groups. It is hardly within the scope of this article to go into detail as to the etiology of these conditions under discussion, in fact, the student wishing to inform himself should seek more extensive treatises than this work will permit. The effort here will be made only to give a general survey, touching upon the factors of major importance.

Evaluation of Arhythmias. In making a prognosis and in outlining treatment, several factors must be taken into consideration. Every irregularity of the heart beat does not necessarily call either for alarm or for treatment. The most important factor is the condition of the heart muscle. In fact, some clinicians prefer to treat arhythmias as symptoms of myocarditis. Next in importance is the condition of the valves, and of the blood vessels. The general status of the patient must be taken into consideration, and other circumstances, particularly as to what extent cooperation can be secured in measures that would seem advisable, but might not necessarily be considered imperative. This includes especially physical rest and freedom from mental disturbances.

Examination.—Any evidence of abnormality on the part of the most important organ in the body naturally calls for a thorough investigation.

History. This should begin with heredity. It includes particularly those factors that are known to be of etiological importance in the induction of heart disease, such as syphilis, the duration of the trouble and the reaction to activity, of the individual.

General Physical Examination. This must be complete, including particularly a search for foci of infection, such as diseased teeth, tonsils, or genito-urinary organs. The heart, of course, should be carefully and repeatedly examined as to size, abnormal sounds, response to exercise, rate, rhythm and blood pressure. The greatest advances in heart investigation since the invention of the stethoscope are the graphic methods that we have in the polygraph and electrocardiograph. Under present conditions, most patients must live and die without the advantage of this type of investigation, but where such methods are available, they should always be employed in any case in which there is doubt as to the condition existing. These patients should, of course, have a thorough urinalysis and a blood picture, including the Wassermann test.

SINUS ARHYTHMIA

General Statement. **Definition.**—This is the type of irregularity that is characterized by a waxing and waning of the heart rate.

Incidence.—It is found particularly in young subjects, though it may develop at any age.

Etiology.—In the majority of cases, no cause can be established. It is occasionally the result of the administration of digitalis.

Course and Prognosis.—The condition usually is not of material importance. More significance has been attached to its development during or following acute infectious diseases, but it is not certain that even here its significance is understood.

Symptoms and Diagnosis.—There are usually no symptoms appreciated by the patient. The condition is easily established by the trained observer simply by feeling the pulse or listening to the heart. The most common type is the respiratory, in which there is quickening of the heart rate during inspiration and a slowing during expiration.

For diagnostic purposes, this may be accentuated by having the patient breathe slowly and deeply. The condition usually disappears promptly upon the heart-rate's being accentuated, as by fever or exercise, or by atropine in sufficient doses.

Treatment.—As usually encountered sinus arhythmia is not an expression of disease and treatment is unnecessary.

HEART-BLOCK

General Statement. Definition.—This cannot be better described than in the words of Lewis. "Heart block is an abnormal mechanism in which there is a delay in or absence of ventricular response to the auricular impulses." Various types are recognized, such as complete and incomplete, acute and chronic. These cases may be placed in three different groups as follows:

First. Those in which there is merely a delay in the transmission of the impulse from auricle to ventricle.

Second. Those in which some of the impulses are not transmitted, giving rise to the various grades of partial heart-block (dropped beat).

Third. Those in which none of the impulses are transmitted, giving rise to the condition of complete heart-block.

Incidence.—These phenomena may occur at any age and among any type of individuals. Its incidence bears some relation to the etiology, therefore, it is more common among young adults at the age rheumatic fever is most common, and among old people at the age of senile heart changes. All types are more frequent among men.

Etiology.—Any condition that causes cardiac pathology may contribute to this type of arhythmia. Among these should be mentioned acute infectious diseases, (particularly rheumatic fever), syphilis, and senility. Heart block may also be unmasked by drugs of the digitalis group.

Course and Prognosis.—Any type of heart block is not inconsistent with a considerable life expectancy. It must be recognized, however, that the condition is an expression of heart damage and the prognosis is based on this more than on the arhythmia. It should always be regarded as of grave import and calls for careful supervision and those general measures that would be indicated by the known evidences of cardiac pathology.

Symptoms and Diagnosis.—The first step is an analysis of a carefully made history, which should include particularly the presence or absence of any disease that is known to be a contributing factor. Considering briefly the three classes. In the first, that is, where there is merely a delay in the transmission of the impulse, recognition is always difficult and usually impossible without the aid of the graphic methods. It has been stated that when the delay is of sufficient length, it is sometimes possible to hear the auricular contraction as a separate sound.

The second group, or that in which some of the impulses are not transmitted, is more easily recognized, in fact, it can be diagnosed usually without the aid of the graphic methods, though the patient should naturally have the benefit when possible, of this more efficient investigation.

The pulse will show a definite pause, this, however, cannot be differentiated from the premature contractions without examination of the heart. Auscultation will demonstrate that, instead of a premature contraction, there is a definite pause corresponding to the time that would be occasioned by a complete missed contraction. This period of ventricular silence is pathognomonic.

The partial heart block should be suspected when there is a sudden slowing of the pulse, particularly when the rate is halved. This gives one of the most common types that is known to occur. Here every other impulse is missed by the ventricle.

The third type, or complete heart block, is recognized by a markedly slow pulse, usually 30 to 40, this is usually regular and is not affected by exercise or position. Every ventricular contraction is associated with a first and second sound, and it has been claimed that at times the auricular contraction can be heard in addition to this. Sometimes the veins in the neck can be demonstrated as pulsating much faster than the pulse rate. When the auricular and ventricular impulses happen to come at the same time, there is naturally a much larger venous pulsation.

In addition to the evidences of one of these types of arhythmia, there may be the signs and symptoms due to impaired heart function from the arhythmia as such or from the incapacity of the damaged heart to carry on its normal work. These, of course, would include all of the evidences of failing compensation.

Stokes-Adams Syndrome is a condition in which complete heart block is associated with convulsive seizures resulting from prolonged intermission of the ventricle and may be regarded as one of the stages of complete heart block. There may be varying effects, such as a transient period of dizziness, actual unconsciousness, twitching of the muscles of the face and extremities, and profound cyanosis.

Treatment.—The first consideration is to search for a possible cause and, if found, give it due attention. If there is a rheumatic fever background, the salicylates should be used. If syphilis can be demonstrated, the patient should receive prompt and energetic treatment.

General Care.—The degree of rest will depend upon the conditions as found, particularly upon the general condition of the patient, the degree of arhythmia, the presence of signs of failing compensation, and the estimate of the extent of heart damage. Under all circumstances the patient should have the benefit of a carefully regulated life, as free from mental and physical strain as possible. Every measure should be employed to maintain a state of general well-being. Excessive weight should be avoided. The fat patient should be carefully and systematically reduced, as every pound of weight naturally requires that much work on the part of the heart. These patients should have a large amount of sleep.

Patients subject to seizures of unconsciousness should be warned of the dangers that may be associated with these attacks, and particularly of such risks as driving an automobile or mixing in crowded traffic.

Medication.—Medication for this class of arhythmia is unfortunately of little value. Where a rheumatic or syphilitic background can be determined, active treatment for these conditions is indicated. Digitalis may convert one of the lower grades into a higher grade of heart block. For this reason, it is usually considered as contraindicated. However, in the presence of failing compensation, digitalis may be tried if there is complete block.

Atropine has been used and probably is of value in some cases. In the Stokes-Adams syndrome, while often disappointing, it is probably the most effective agent. It may be given in doses of about $\frac{1}{150}$ grain (0.0004 Gm.), three or four times a day.

Barium Chloride is being recommended for speeding up the ventricular contractions. Adrenalin chloride is used to meet emergencies.

PREMATURE CONTRACTIONS

General Statement. Definition.—This condition is frequently spoken of as ventricular extra systoles, but this term is somewhat confusing to many. The condition is not necessarily due to extra systole, but to premature ones. Ectopic beats is a good term.

It is that type of irregularity in which the regular orderly movements of the heart are interrupted by a premature contraction, followed by a pause of more than the normal length. If the premature impulse originates in the auricle, the following pause does not quite compensate for the shorter interval preceding the abnormal beat. When the impulse originates in the ventricle, it does; that is, the total number of contractions per minute is not changed.

Incidence.—No group is entirely exempt. It is more common in early middle life, particularly during the third and fourth decades. It is more frequent among men. Some observers claim that probably everyone at some time during life is affected by this condition.

Etiology.—In the majority of cases, no definite etiological factor can be demonstrated and the condition seems to be purely functional. It has been proven, however, that many of these cases are the result of heart damage; therefore, a thorough investigation is always called for. The author is convinced that acute infectious diseases, particularly epidemic influenza, often result in changes that initiate this arhythmia. In some instances there seem to be definite causes that will precipitate a transient attack, such, for example, as the use of tobacco, caffeine-containing beverages, alcohol, or excessive eating.

Course and Prognosis.—The cases without cardiac pathology do not seem materially to interfere with the well-being of the individual. The cases with heart damage are to be considered mainly from that standpoint.

Symptoms and Diagnosis.—In premature ventricular contractions occurring singly, patients are often distinctly conscious of every ectopic beat. They frequently give a history of an accentuation of the condition just after retiring at night. There may be a tendency to cough, to take a quick inspiration, or to give some other evidence, particularly where the abnormal beats are not very frequent. Some describe a sense of "goneness" in the region of the heart or a feeling as though the heart "cuts a somersault," when the irregularity occurs. The diagnosis is established by the regular pulse being interrupted by a pause practically corresponding to the loss of an entire beat. This same pulse finding might be present in heart block. The differentiation is made by auscultation over the precordium. It will here be found that there is not a period of silence corresponding to a missed beat, but that the orderly sounds are interrupted by a premature concontraction followed by the pause of unusual length, the following beat being unusually forcible.

Treatment.—Where a patient is cognizant of some particular condition as precipitating the attack, such as excessive smoking or eating, these factors should certainly be eliminated. If the presence of heart damage cannot be demonstrated, there is no necessity for curtailing the activity of the individual.

Emphasis should be laid upon reassuring the patient as to the true nature of his condition. Much unnecessary anxiety may be prevented.

In medication there is now much to offer. Quinidine sulphate is of distinct value, the usual dose being 5 grains (0.3 Gms.), two or three times a day, until the condition has been relieved or the inefficiency of the drug demonstrated. If it gives relief, the dosage may be reduced to one capsule a day and continued for some weeks. Needless to say, a patient taking this drug, particularly in the intensive way, should be under observation.

Digitalis may lessen the frequency of the occurrence of irregularity or cause its disappearance, especially in those cases where there is some cardiac insufficiency. In other instances, it seems to aggravate the condition. Only trial can determine this.

SIMPLE PAROXYSMAL TACHYCARDIA

General Statement. Definition.—This is a condition in which the regular rhythm of the heart is interrupted by a series of rapid contractions. These vary in rate from about 110 up to 220, the average being from 160 to 200. The beginning and termination of the attack is sudden.

Incidence.—While it may occur at any age and among all types of people, it is more common in early adult life, the greatest number of cases for any decade being between twenty and thirty. It is more common among men than women.

Etiology.—In a fairly large percentage of cases, no definite cause can be demonstrated. Acute infectious diseases certainly play a rather active part, and among these acute rheumatic fever is the most common. In many of these cases no heart damage can be demonstrated; in others, definite pathology exists. In a general way it may be said that any condition causing heart damage may be a factor in the production of this particular type of arhythmia.

Course and Prognosis.—Several factors must here be considered. These are the general condition of the patient, the presence or absence of heart damage, and the frequency and duration of the attacks. It may be stated that the longer the condition has persisted, the more serious the outlook. In a large majority of instances, the attacks are recurrent. They may vary from a few seconds in duration up to a period of days. They may often be precipitated by such factors as excitement or gastric disturbances. Paroxysmal tachycardia should be classed among the more serious arhythmias.

Symptoms and Diagnosis.—The symptoms will depend to a large extent upon the condition of the heart, particularly the myocardium. When the heart is in good organic condition, especially if the patient is not of a highly nervous type, there may be little inconvenience in a short attack. The symptoms in a given case will depend upon the heart rate and the duration of the attack. In the majority of instances, the patient is distinctly conscious of the abrupt onset and recognizes the fact that there is palpitation. The discomfort in the precordia may be only a slight sense of oppression, or it may be a distinct pain. As the condition progresses, there may develop a sense of disability and exhaustion. Later there may be distinct gastro-intestinal disturbances, such as nausea or vomiting.

Upon examination the heart will be found to be contracting at a rate of about 150 to 200 per minute, sometimes more sometimes less. This rate is regular and is not affected to any appreciable extent by change in position. Later there may be all of the signs and symptoms of failing compensation. There is a tendency for both the rate and the duration of the attacks to be about the same in different seizures. An essential characteristic is the abrupt onset and termination.

Prophylaxis.—Prevention consists in finding the possible etiological factors and removing them, or avoiding those things that are known to precipitate trouble.

Treatment.—All possible etiological factors should be sought for and, if found, receive proper attention. The patient should also have the benefit of all measures looking towards establishing and maintaining an excellent state of well-being. A possibility of muscular damage or valvular defect should always be borne in mind, and careful and repeated investigations made between attacks.

For the relief of the acute paroxysms, many measures have been suggested. The value of any of these is certainly limited. Very often the patient knows of some plan that will give relief, and this should always be investigated, that is any measure that has seemed to terminate preceding attacks. Briefly, the following have at times seemed to be of value:

Holding the breath as long as possible after a forced inhalation or a forced exhalation.

Assuming certain positions, such, for example, as sitting up in bed with the knees drawn up and the head bent as far forward as possible.

An ice bag to the precordia.

Pressure upon the vagus nerve. The usual plan is to make pressure over the carotid artery until the pulsation has been obliterated.

The induction of emesis.

Putting the individual to sleep, as by a hypodermic of morphine.

An intravenous injection of digitalis. Digitalis by mouth seems to have no effect.

Quinidine sulphate is now being extensively employed. Eserine has been recommended.

Lewis recommends the wearing of a tight abdominal binder, which seems to be of particular benefit in preventing the recurrences in those patients that are subject to frequent attacks. Where there is much pain, morphine or codeine by needle, or codeine and acetylsalicylic acid by mouth, may have to be used.

AURICULAR FIBRILLATION

Definition.—This is a condition characterized by gross ventricular irregularity due to the absence of normal auricular contractions and orderly impulses being transmitted to the ventricle. This arhythmia may be paroxysmal or permanent.

Incidence.—No race, age, or condition is immune. It is rare in infancy. The majority of cases may be grouped under two heads:

1st. The rheumatic, which occurs most frequently between the ages of twenty and forty.

2nd. The non-rheumatic, occurring most frequently between the ages of sixty and eighty.

The condition is more common among men, particularly those cases developing in early life.

It has been stated that from 50 to 70 per cent of the cases of heart failure admitted to general hospitals are cases of auricular fibrillation.

Etiology.—As suggested in the preceding paragraph, acute infectious diseases, particularly rheumatic fever, seem to be directly responsible for a large percentage of these cases. Syphilis and arteriosclerosis also account for a fairly large number. The immediate cause is myocardial damage, therefore, any condition that lends itself to myocardial or valvular impairment may result in this type of irregularity. It has been demonstrated that over 50 per cent of these cases coming to autopsy have mitral stenosis, also that more then half of the cases of mitral stenosis develop auricular fibrillation.

Course and Prognosis.—This depends mainly upon the following conditions. The extent of the heart damage, particularly the myocardium. The heart rate, usually the more rapid the rate the graver the prognosis. The general condition of the patient independent of the heart damage. The intellectual and financial status of the patient and family,—that is their ability and willingness to cooperate in a plan of continued management. Last, but not least, the reaction to treatment. Those cases that tolerate digitalis well and respond favorably, naturally have a more favorable prognosis. The condition is not incompatible with many years of more or less useful life.

Symptoms and Diagnosis.—These depend largely upon the extent of the heart damage, the stage of development of the arhythmia and the degree of severity of the condition. Many of the symptoms as noted in the average case are unquestionably due to the heart damage, aside from the arhythmia.

Subjectively the patients may be conscious of a cardiac disturbance. They often experience the feeling that they have palpitation and describe the heart as tumultuous in its action. Sooner or later there is shortness of the breath, dyspnea, particularly upon exertion, and as the condition progresses, there are always more or less of the classical signs of failing compensation. The pulse rate is usually between 90 and 140, though much slower or more rapid rates are occasionally observed. The irregularity is in both rhythm and force, the latter may be demonstrated easily by the careful application of the sphygmomanometer. It will be found that a degree of pressure can be reached that will exclude some of the radial pulse beats, while it will permit others to come through.

The following diagnostic points have been described by Lewis and other observers:

When the ventricle beats irregularly at 120 or over, the condition is probably auricular fibrillation

When irregular ventricular action is associated with other signs of failing compensation, it is probably fibrillation, and if the pulse rate is much accelerated, the diagnosis is almost certain.

Exercise augments the irregularity in fibrillation, while in other conditions it has a tendency to lessen the irregularity. Deep breathing does not materially affect fibrillation and there is no tendency for the arhythmia to adapt itself to the respiratory phase, as is found in sinus arhythmia. Fibrillation shows a distinct tendency to persist.

Treatment.—It must be remembered that this type of disorder is largely an expression of myocardial damage; therefore, the patient should have the benefit of a thorough examination from every standpoint and the correction of all possible contributing factors. There should also be brought into use every measure that will tend to the general well-being of the individual, such as attention to dental prophylaxis and intestinal elimination.

General Care.—The restriction of activity will depend largely upon the condition of the patient as a whole. During the period of intensive treatment and always in the presence of the evidences of failing compensation, there should be absolute rest in bed. This rest must be both mental and physical, business and domestic worries and all disturbing influences being eliminated.

Specific Treatment.—Digitalis may be regarded as almost a specific. There are few treatments in medicine which give more gratifying results. It should be borne in mind that digitalis does not correct the heart damage that is back of the arhythmia. Through the excellent work of Eggleston, Hatcher, Halsey and others, digitalis medication is now on a safer and more effective basis, and the results are correspondingly more satisfactory. The drugs of the digitalis group are all employed, but with the exception of digitalis, their field of usefulness is limited. Excepting strophanthin, they are seldom to be considered.

Preparation. The properly prepared standardized tincture of digitalis is the preparation of choice for general use. For emergency some of the special intravenous preparations may be used to advantage. The tincture prepared by the local pharmacist should never be employed. Unfortunately, there is still considerable lack of uniformity in even the best of the products on the market.

Dose and Administration. Several plans are in more or less common use. Of these the following two possibly meet the requirements best; in either plan, the recent administration of drugs of the digitalis group must be taken into account.

In the first plan, the dosage is based on the body weight of the patient, due allowance being made for edema. 1 fluidrachm (4 cc.) of the tincture for every thirty pounds of body weight is given within the course of about forty-eight hours. For example, a patient weighing 150 pounds would receive five fluidrachms (20 cc.) during the period of intensive treatment. The usual custom is to give about 3 fluidrachms (12 cc.) during the first twenty-four hours and 2 during the second twenty-four hours. Many prefer to give one-half of the total amount at the first dose. Eggleston particularly has advocated this plan. Subsequent treatment on what is called the maintenance dose will be discussed later.

The second plan, which may be used in selected cases, under close observation, is to give a fluidrachm of the tincture every eight hours until satisfactory results have been obtained, toxic symptoms have developed, a reasonable limit of safety has been reached, or the inefficiency of the drug has been demonstrated. In all of the plans of intensive treatment, but in this one particularly, careful supervision by the attending physician is essential. In the last plan under discussion, the patient should be seen by the physician before the administration of each dose, particularly after the first two or three doses. This will insure the prompt recognition of satisfactory results or toxic symptoms, so that the dosage may be modified. In intensive digitalis medication, the dose is reduced or the drug discontinued should the pulse drop below 70 or 80, or symptoms develop such as coupled beats or marked gastro-intestinal disturbance. A maintenance dose requires considerable individualization. Lewis places these cases in three groups:

First. Those in whom the normal rhythm is maintained without further medication.

Second. Those in whom it is maintained by small doses.

Third. Those in whom it is maintained only by the use of large doses.

In a large percentage of cases, the beneficial effect of the treatment is only maintained by the continued use of the drug. Theoretically the maintenance dose, as based on demonstrated digitalis elimination, would be from 15 to 20 minims (1 to 1.3 cc.) total per day. In practical experience, larger doses are often required.

Where digitalis is not tolerated sufficiently to justify its further use, strophanthin may be employed intravenously in doses of about ½₁₂₀th of a grain (0.0005 Gm.), with not over two such doses in twenty-four hours. This is particularly useful to meet emergencies, but it is rather dangerous and should be employed with extreme caution, particularly when the patient has recently had appreciable amounts of either digitalis or strophanthin.

Quinidine Sulphate. This is lately being used particularly for the relief of those cases that are not benefitted by or cannot take the digitalis treatment. The usual plan of administration is somewhat as follows:

The first day the tolerance of the patient is tested by two doses of 3 to 5 grains (0.2 to 0.3 Gm.) each. The second day, if no contra-indications have developed, the drug is given in 5 grain (0.3 Gm.) doses every 2 to 4 hours to a total of 20 to 30 grains (1.3 to 2 Gm.). This dosage is continued for several days, unless relief is obtained or unfavorable symptoms develop. The patient should be under close observation and the dose promptly reduced or the drug discontinued, when indicated. The maintenance dose (if such is indicated) requires individualization; usually about 3 to 5 grains (0.2 to 0.3 Gm.) a day meets the requirements and may be continued as indicated. The drug is not without danger and careful, intelligent supervision is necessary.

AURICULAR FLUTTER

General Statement. Definition.—Auricular flutter is that condition in which the regular orderly mechanism of the auricles is replaced by a movement that consists of a contraction wave following a "circular and never ending path," resulting in an extremely rapid rate of ventricular contraction, the rhythm remaining regular. The rate of movement in the auricle ranges from 140 to 350 per minute, the most common being from about 260 to 320. The ventricle is unable to respond to impulses falling in such rapid succession, so usually contracts to every second or third impulse. Some degree of heart block is probably always present in those cases that survive sufficiently long to be diagnosed, as sustained ventricular contraction at the auricular rate is not compatible with life. The most common form of heart block is the two to one type, that is, the ventricular rate being one-half that of the auricular.

Incidence.—While this condition may occur among persons of any race, age, or condition, it is more often found among those in advanced years and is more common in males than females. It is extremely rare, or at least it is very rarely diagnosed.

Etiology.—Any factor that contributes to heart damage will play a part in the induction of this type of arhythmia. This would include the acute infectious diseases, syphilis and arteriosclerosis, and in fact, all conditions that tend to produce myocardial damage. The condition can be said to be a symptom of myocarditis.

Course and Prognosis.—This will depend upon many factors, particularly the organic condition of the heart. While paroxysmal flutter sometimes occurs, the condition, once it develops is usually permanent, except as it is relieved by treatment. It may last for months or for years.

Symptoms and Diagnosis.—It is difficult for a definite diagnosis of auricular flutter to be made without the aid of the graphic methods, particularly the electro-cardiagraph, except by noting the effect of full therapeutic doses of digitalis.

The subjective symptoms are rather indefinite and do not materially differ from those of paroxysmal tachycardia, except that as a rule the interference is more profound. When the condition develops there will of course be evidences of cardiac insufficiency. The ventricular contractions are usually slower than those of paroxysmal tachycardia, in which the rate is often in the neighborhood of 200. In auricular flutter this would mean an auricular rate of twice that much, which does not seem to obtain. The pulse rate is usually regular. If there is an irregularity, conditions that increase the pulse rate, as exercise, tend to abolish the irregularity. This is of value in differentiating from fibrillation, in which the irregularity is increased. The auricular impulses may sometimes be observed in the veins of the neck. This arhythmia is also differentiated from simple paroxysmal tachycardia by its tendency to persist.

Another valuable diagnostic point is the effect of digitalis, which usually first creates an irregularity and then slows the pulse, while in the simple tachycardia it usually has no appreciable effect. In all suspected cases, the patient should certainly have the benefit of the graphic method of investigation.

Treatment.—The principal consideration is the treatment of the heart as a whole, with the fact in mind that the irregularity is a symptom of more or less extensive heart damage. Any etiological factor should be sought for and eliminated. This, of course, includes rheumatic fever, foci of infection, and syphilis.

General Care.—The restriction of activity will depend largely upon the evaluation of all available data. Certainly during the period of intensive treatment the patient should be at rest in bed under careful observation. The return to activity should be gradual and carefully regulated. All mental and physical strain should be eliminated as far as possible.

Special Medication.—Digitalis is the drug of paramount value in this condition. Lewis rates it as practically specific. The ventricular rate can always be reduced by giving it in sufficient doses, and the benefit may be maintained by continuing the treatment. Also, if the full dose is maintained, the flutter ceases and fibrillation develops. If digitalis is then withdraw, the fibrillation may disappear and the normal rhythm be resumed. Digitalis may be used as for auricular fibrillation, see page 346.

ALTERNATION OF THE HEART

General Statement. Definition.—This is the condition in which the regular mechanism of the heart is replaced by alternating beats of different force.

Incidence.—While it may occur during acute infectious diseases at almost any age, it is usually found late in life.

Etiology.—It is an expression of heart damage and would have, therefore, practically the same etiology as the preceding types of irregularity.

Course and Prognosis.—It is a manifestation of serious import and usually means extensive myocardial damage.

Symptoms and Diagnosis.—The condition is seldom recognized except by graphic methods, but should be. It usually can be readily demonstrated by the careful use of the blood pressure apparatus, by making sufficient pressure to eliminate every second pulse beat. The condition is rare and more rarely diagnosed.

Treatment.—This consists entirely of attention to the damaged heart. There is no treatment of the arhythmia.

ANGINA PECTORIS

General Statement. Definition.—While the term means, literally, chest pain, it is usually employed to designate that type of pain originating particularly in the heart. Angina pectoris is not a separate disease entity but an expression of cardiac distress.

Incidence.—Any race or type of individual may be affected, but it is more common in middle and late life. It is also much more common among men.

Etiology.—MacKenzie classified this condition into two groups:

First. Those that are the result of heart damage.

Second. Those resulting from toxic or debilitating causes.

He further regarded this pain as an expression of exhaustion of the heart muscle. If this theory be accepted, and it seems logical, it will be readily understood that any condition that will impose an excessive burden on the heart or reduce its functional capacity, will lend itself to the development of this pain. It is also recognized that instability of the nervous system may be a decided etiological factor. Among those conditions of importance that should be mentioned are excessive physical effort; mental or nervous strain, as resulting from worry or sleeplessness; conditions that increase the burden of the heart, as arteriosclerosis, renal diseases, high blood pressure; and heart damage, particularly diseases of the muscles, of the coronary vessels (as sclerosis, thrombosis and embolism) and of the aortic valves. We would, therefore, have to include in the etiology, as important factors, the arteriosclerotic changes due to age and the ravages of syphilis, and rheumatic fever.

Course and Prognosis.—This depends upon several factors, such as the primary cause of the trouble, the condition of the heart, the severity of the attacks, and the ability of the patient to cooperate in treatment. The severity of the pain is not necessarily a true index to the extent of the damage and the seriousness of the outlook. The first attack may prove fatal, and all physicians of wide experience have encountered such cases; on the other hand, it is well known that attacks of angina pectoris are not incompatible with many years of useful life. A determining factor of importance is the possible degree of limitation of effort.

Symptoms and Diagnosis. History. Of particular importance is an investigation of the limitations of physical effort, as to when the symptoms first appeared, how long they have endured, whether or not the field of effort has been lessening and, if so, at what rate and to what extent. The history should also be investigated for other evidences of circulatory damage; and as to syphilis, rheumatic fever, or other conditions that might be possible etiological factors. The history of the habits, vocation, and manner of living of the patient should be included. The possibility of hysteria and neurasthenia, particularly in women, must be borne in mind.

General Examination. This should be thorough, with particular attention to existence of impairment of the circulatory apparatus or conditions which might contribute to such impairment, as renal diseases and foci of infection.

Pain and Discomfort. This may present a wide diversity both as to character and severity. Among the most common evidences is a sense of constriction or oppression in the chest. MacKenzie attributed this, at least in part, to the fixation of the thoracic muscles, particularly the intercostal, just as the abdominal muscles are fixed in appendicitis. There is also a sense of dyspnea, though actual shortness of breath does not usually exist, or, at least, to no greater extent than would naturally result from the muscle fixation. In the severer attacks, there is usually a sense of impending dissolution. The actual pain may be violent and of short duration, lasting only from a few seconds to a few minutes, it may be of moderate character and short duration, or it may persist even for hours. It may be a dull ache, amounting to little more than a general discomfort and subsiding upon rest or medication, or it may persist for hours. In some instances there is a marked tendency to recurrent paroxysms that come at longer or shorter intervals for hours or for days.

The pain is usually felt in the precordium or somewhat to the left, and may be referred to the left shoulder and down the inner side of the left arm. It may also be referred to the neck or the right arm. I have known cases where it seemed to be felt with almost equal severity in the two arms. It can usually be demonstrated that the attack has been precipitated by some condition that has put a strain on the heart muscles, such as physical effort or the chilling of the surface of the body.

Hyperesthesia. There is often a more or less persistent hyperesthesia of the skin in the region involved and sometimes even of the muscles. MacKenzie mentioned especially the pectoralis major, where it forms the anterior axillary wall, and the upper border of the trapezius.

Of particular importance from a diagnostic standpoint is the response to remedial measures, such as rest and the use of the vasodilators.

Differential Diagnosis.—Among those conditions most confusing are acute indigestion, pleurisy, and neurological conditions, as neuritis and neuralgia. We must also eliminate, in many cases, hysteria.

Pleurisy if sufficient to cause pain, is almost certain to give evidence upon physical examination. It is also associated with evident lung involvement or acute respiratory affections. It is almost always associated with cough, and usually with an increased pulse rate and increased temperature. The pathognomonic symptom of pleurisy is that the pain is respiratory in character, being relieved or entirely absent when the respiratory movement is temporarily suspended.

Acute indigestion usually gives a history of dietary indiscretions. It should be borne in mind, however, that dietary indiscretions may precipitate an attack of angina pectoris. In acute indigestion the pain is usually referred to the epigastric region and downward, but it must be remembered that the pain of angina pectoris may be also referred somewhat in this direction. I have seen two cases with true angina pectoris where the pain was referred entirely across the epigastric and lower costal regions. The pain in indigestion, however, is not referred to the left shoulder and down the inner side of the arm, and it is not relieved by vasodilators and rest.

Hysteria will usually give certain bizarre symptoms that do not run true to form. There are usually other evidences of a functional, nervous disorder. The condition does not respond to the remedial measures. There is not the evidence of intense suffering, such as pallor, beads of perspiration on the forehead, and muscular rigidity of the chest.

Prophylaxis.—In a general way it may be said that the prevention of angina pectoris depends upon the proper treatment of those conditions which may cause it. It also includes attention to all of the details of life, looking towards a state of well-being, and conserving the circulatory apparatus against unnecessary wear and tear. The prevention of acute attacks resolves itself largely into keeping the activities of the individuals within their field of limitations and avoiding other causes, as over-eating and exposure.

Treatment.—The primary consideration is to find the cause and, if it be such as can be removed, to give it due attention. There is probably no condition that requires a more careful regulation of every minute detail of the individual's life.

General Care.—A careful inquiry or a period of observation may soon establish the extent to which the patient may function mentally and physically, and he should be kept well within this limit. In some cases it is advisable to give a period of absolute rest until the exhausted heart muscles can recuperate. In all cases limitation of every phase of activity must be definitely ordered. Individualization is essential. One patient may have to spend a good part of his time in a recumbent or semi-recumbent position; another patient may be able to lead a moderately active and useful life; but even the mildest cases, or those with the widest range of possible activities, must be urged to observe certain restrictions. The business man must pass on to others most of the gruelling details of his affairs. A large percentage of his time must be spent in rest. Recreation must be of a type that involves little physical exertion, and especially mental strain or long sustained effort must be avoided. Someone has suggested that all of these cases that are ambulatory should arrange their affairs so that they can take frequent vacations. It should be emphasized that in addition to this, they should take some vacation each day; that is, a part of every day should be devoted to relaxation, rest, and pleasant diversion.

These patients should maintain the most careful oral hygiene; body cleanliness should be carefully observed, but cold baths avoided. They should be comfortably and warmly clothed and under all circumstances avoid exposure, particularly to cold. This would apply to their sleeping and business quarters and their outdoor recreation.

Intestinal elimination should receive careful and systematic attention.

Diet.—Under all circumstances the food should be such as can be easily digested. Careful inquiry should be made here and all food avoided that would seem from past experience to be a possible source of trouble. In a general way it is best to avoid a high proteid diet or food that is highly seasoned.

General Medication.—This must depend to a large extent on the general condition of the patient. The iodides have been extensively used. It is the one drug that seems by general concensus of opinion to be of value in routine medication. Some give a small dose as 5 grains (0.3 Gm.) a day, others give larger doses running up to 50 or 100 grains (3 to 6 Gms.) a day. Many other drugs are recommended and probably have value.

Symptomatic Medication.—Where there is nervous instability, the bromides are of value as the action is sedative and there is no danger of habit. MacKenzie recommended ammonium bromide in 20 grain (1.3 Gm.) doses, one to three times a day. If there is sleeplessness that is not relieved by the bromides, chloral hydrate or other mild hypnotics may be used, as needed.

Treatment of Attacks. The first consideration is absolute rest, mental and physical. If the pain is severe, morphine, with proper precautions, may be given by hypodermic. Not only does this drug relieve pain, but it favorably influences the mental state, quiets the nervous excitement, and promotes rest and sleep.

The most uniformly valuable agents are the vasodilators, particularly amyl nitrite and nitroglycerin. Amyl nitrite is used in the form of pearls, by crushing one in a handkerchief and inhaling the vapor. A patient subject to this condition should always carry these pearls if it has been found that they give relief, as often an attack may be aborted in its incipiency by this method alone. Next in value for rapidity of action is nitroglycerin. It may be given by hypodermic or by mouth. A hypodermic tablet placed under the tongue will be rapidly absorbed. The dose is from $1/50$th to $1/100$th of a grain (0.0013 to 0.0006 Gm.).

In the high blood pressure cases with a tendency to angina pectoris, sodium nitrite in doses from $1/2$ to 3 grains (0.03 to 0.2 Gm.) combined with sodium iodide may be given three times a day for a sufficient period.

Many other measures have been recommended for the treatment of acute attacks, particularly the inhalation of oxygen.

DISEASES OF THE KIDNEYS AND BLADDER

NEPHRITIS, NEPHROSIS AND SCLEROSIS

General Statement.—There are few conditions in medicine in which there is less unanimity in the matter of classification than in those kidney processes included under the head of Bright's disease. Some place all of these under two heads: Acute Nephritis and Chronic Nephritis. Many take the position that for all practical purposes the acute may be considered as parenchymatous and the chronic as interstitial.

Probably the most practical, detailed classification that has been suggested is that advanced by Volhard and Fahr. McElroy in his excellent article in Tice's System sums up this classification somewhat as follows:

First there are three main divisions: Nephrosis, the degenerative processes; Nephritis, the inflammatory processes; and Sclerosis, the arteriosclerotic processes. These are subdivided as follows:

NEPHROPATHIES

A. Degenerative diseases: *Nephroses*, genuine and of known etiology, with and without amyloid degeneration of the vessels.
  (1) Acute course.
  (2) Chronic course.
  (3) End stage: Nephrotic contracted kidney without increased blood pressure.
B. Inflammatory diseases: *Nephritides*
  (1) Diffuse glomerulonephritis with obligatory increased blood pressure. Course in three stages:
    (*a*) Acute stage.
    (*b*) Chronic stage without kidney insufficiency.
    (*c*) End stage with kidney insufficiency.
    All three stages may run a course
      (*a*) without edema
      (*b*) with edema, *i. e.*, with marked and diffuse degeneration of the epithelium.
  (2) Focal Nephritis, without increased blood pressure:
    (*a*) Focal glomerulonephritis.
      (1) Acute stage.
      (a) Chronic stage.
    (*b*) Septic interstitial nephritis.
    (*c*) Embolic focal nephritis.
C. Arteriosclerotic diseases: *Sclerosis.*
  (1) Benign hypertension—pure sclerosis of the kidney vessels.
  (2) Malignant hypertension—the combination form, genuine contracted kidney sclerosis, plus nephritis.

A brief outline of the principal differential points in these three groups may be of advantage here.

Nephritis is more apt to result from an acute stormy process, as acute tonsillitis or rheumatic fever. Nephrosis is more apt to result from a chronic process as syphilis or tuberculosis. Sclerosis is the arterioslcerotic (old age) process.

Nephritis is chiefly characterized by high blood pressure, cardiac enlargement, changes in the eye grounds, hemorrhage and impaired function tests. Nephrosis shows no elevation of blood pressure, cardiac enlargement or eye ground changes, less tendency to hemorrhage or impaired function tests, more edema. Sclerosis presents the usual finding of hypertension with or without evidence of nephritis.

It will hardly be within the scope of this article to give a detailed discussion of the groups of diseases under these heads. The main object here is to present the subject of kidney diseases so arranged that it can be followed with the greatest possible convenience by the greatest number of students. One reason for this is that with the facilities available, in many cases, it is rather impossible to make a definite diagnosis as to the particular type. Another factor is that these types are so frequently mixed. Also from the standpoint of treatment, an exact diagnosis is immaterial in most cases and the management is based upon the apparent requirements of the individual patient. For example, in the presence of edema, no matter what may be the type of the disease, the therapeutic measures for relief are the same. In this discussion, therefore, we shall use three groups; first, acute nephritis and nephrosis; second, chronic nephritis, nephrosis; third, sclerosis. Attention will be called to special features as indicated.

ACUTE NEPHRITIS AND ACUTE NEPHROSIS

Incidence.—Nephritis is more common in early life, a large per cent of the cases developing in the first two decades, when acute infectious diseases are most prevalent. Nephrosis is more often found in later life, during the period of chronic disease processes. Both conditions are more prevalent among males and particularly those social groups most subjected to unfavorable living conditions.

Etiology.—The etiological factors involved in the development of the degenerative and inflammatory types are largely the same. The degenerative process (nephrosis) is more apt to result from such causes as tuberculosis, syphilis, chronic foci of infection, malignant growths, pregnancy and chemical poisons. The inflammatory process (nephritis) results most frequently from the acute infectious diseases as scarlet fever, diphtheria, tonsillitis, rheumatic fever, erysipelas and pneumonia. Among these conditions scarlet fever, diphtheria, and tonsillitis are by far the most common sources of trouble.

It should be borne in mind that the inflammatory type of this disease (nephritis) is much more common than the degenerative type (nephrosis). McElroy, for instance, places the proportion in his practice as about nine to one.

The exciting cause of acute nephritis is rather universally regarded to be of bacterial origin. Many competent observers are convinced that certain types of streptococci, particularly, play a very active rôle.

Among the predisposing causes is heredity. There seems to be a lessened resistance on the part of some family groups as compared to others, just as we find a tendency to tonsillitis or arthritis. Age, sex, vocation, and economic status are also factors, as previously suggested.

Symptoms and Diagnosis.—The symptomatology of these groups will be considered together as far as is practicable.

History. Of particular importance here is the history of a preceding or present condition that is known to be an etiological factor; such, for example, as an acute infectious disease, a focus of infection, or a chronic process (as syphilis). The statement of a previous attack of kidney disease is also of importance.

Onset. Nephrosis usually has a gradual onset. The diffused glomerulonephritis is apt to develop rather suddenly and to be somewhat stormy in character. It generally manifests itself two or three weeks after some acute infection. The focal glomerulonephritis usually develops earlier or is coincident with the causative infection and the onset is rather abrupt.

Edema. This is one of the common symptoms and is often that which first calls attention to the presence of acute kidney disease. It is most marked in nephrosis. In these there is apt to be general anasarca and more of such conditions as hydrothorax and ascites.

In the acute diffused nephritis, there is usually edema, though it may not be marked and general anasarca with ascites and hydrothorax is rare. In the acute focal nephritis the tendency is to slight edema or none at all. In the mixed types, edema is usually present. These facts are important for the reason that some physicians are apt to overlook acute kidney disease as a possibility until edema is present.

Gastro-intestinal Symptoms. All of these types are very apt to show anorexia and nausea, and frequently vomiting. This may be persistent and highly resistant to treatment.

General Disability. A fairly constant evidence is a feeling of exhaustion and general prostration. This may be quite pronounced or may find expression only in a feeling of languor and impaired efficiency. This is one of the symptoms that often directs attention to the fact that all is not well.

Loss of Weight. Where edema is present, there may be considerable apparent gain in weight and very often the individual or family will be congratulating themselves on the progress of the patient's condition until the fact has been demonstrated that the gain resulted from edema. Except for this there is a tendency to a fairly rapid loss of body substance.

Pallor. This is a common symptom and often calls attention to kidney disease. The actual cause of this condition has not been satisfactorily established; it is usually out of all proportion to the actual blood findings.

Fever. In acute nephrosis there is not much tendency to elevation of temperature. In nephritis proper, (any type) fever is rather a common symptom, and at times the temperature will be quite high.

Chills. In acute nephrosis, chills are unusual. In acute nephritis there is a tendency to chills such as would be expected from an inflammatory process. In children there may be convulsions. In adults convulsions in the acute type of the disease are rather rare and when they do develop usually come late in the process.

Pulse. There is usually an increased pulse rate, particularly in nephritis.

Blood Pressure. In nephrosis and focal nephritis there is no elevation. In the diffused nephritis, the tendency is to a high pressure; in fact, it is rather an essential finding.

The Heart. In nephrosis or focal nephritis the heart is not usually affected in size and murmurs are not often present. In the diffused type of nephritis there is a tendency to murmurs and cardiac hypertrophy; in fact, it is in this type of the disease that we usually find the clinical picture of decompensation.

Uremia. Uremia is rare in the early stages of the acute kidney diseases. It is more apt to develop in the diffused nephritis.

Laboratory Examination. The blood examination is usually negative unless the primary process causing the kidney disease has produced changes.

Urine. In all types there is a tendency to diminished quantity early in the disease. Later, particularly in nephrosis, the quantity will be materially increased. The reaction may be acid or alkaline. The specific gravity may be normal. In the diffused nephritis, there is a tendency to a low specific gravity, but this finding is not of material advantage in establishing a general diagnosis of acute kidney disease. In all types of the disease, albumin and casts are rather a consistent finding, although they may vary in amount through a wide range. Blood in the urine is not a characteristic finding in nephrosis; in nephritis it is usually present, particularly early in the disease.

The function tests are not reliable in establishing a diagnosis in the early stages of acute kidney disease, as they are affected largely by the extent of the damage done. In the chronic stages, they are, of course, invaluable. There is, naturally, a tendency to increased impairment as the disease progresses. The function tests will be considered in detail in the discussion of the chronic types of the disease.

From the foregoing it will be noted that this group of conditions, although differing somewhat in etiology, are usually classed under the head of acute nephritis. The symptoms show so wide a range of variation that we cannot arbitrarily demand too much in the way of definite evidence before we make a diagnosis and establish treatment.

There is a tendency to general disability, gastro-intestinal disturbances, edema, albumin and casts in the urine, and other findings; but the diagnosis usually has to be made by a careful evaluation of all the available evidence. Not only are the findings in the various types of acute kidney disease variable, but the findings may change from time to time as the disease progresses. As an illustration of this, during the stage of development of edema the urine output may be considerably lowered; during the stage of subsiding edema, it may be materially increased.

Prophylaxis.—The prevention of kidney disease covers the prevention of or prompt attention to those conditions that are known to be etiological factors, also the proper consideration of the kidney in the treatment of those diseases. This would include not only the particular care in protecting young persons against acute infectious diseases and all against tuberculosis, syphilis, and similar conditions, but there is also the responsibility of so managing these disease processes that the least possible damage will be done to the kidneys. Of particular importance here is proper diet and sufficient rest in bed during sickness and convalescence, especially in such diseases as scarlet fever and diphtheria. Foci of infection as diseased tonsils or teeth should be removed. Drugs that are known to be renal irritants should be avoided if possible; and, if given, frequent urinalyses should be made and the treatment influenced accordingly.

Care in the matter of diet in the course of any disease is of major importance here. It is probable that a high protein diet may be an etiological factor even in a state of health; and it is certainly more probable that in sickness it may result in trouble. Of much importance also is the high seasoning of food.

Even in a state of health free exposure to cold and wet may be productive of trouble, and this would most certainly be true in the presence of disease and particularly of that type which might involve the kidneys. As has been pointed out by many writers, those families that have a tendency to renal disease should take particular care with regard to all of these precautions.

Treatment.—In nearly all of the various forms of acute nephritis and nephrosis the treatment is so nearly the same as to make it advisable to consider them as a whole and to individualize more in the way of the symptomatic treatment, without particular regard to type. This is often necessary for the reason that they may be mixed or it may be impossible to differentiate one type from the other.

General Principles in Treatment.—Shattuck and others have outlined certain fundamental principles of treatment that will apply in practically all cases. This is somewhat as follows:

First. Remove the cause
Second. Protect the kidneys
  (*a*) Rest
  (*b*) Elimination
    (1) By bowels
    (2) By skin
  (*c*) Diet
  (*d*) Limitation of liquids
Third. Maintain nutrition
Fourth. Avoid exposure
Fifth. Care as to the use of drugs

The removal of the cause is, naturally, the consideration of first importance. In the presence of kidney disease the investigation should be directed first toward finding the primary source of trouble and giving it due attention. This would include the treatment of the causative disease; the removal of foci of infection; the proper adjustment of diet; and, in short, direct attention to any possible factors that might affect the kidneys.

Special Treatments.—From time to time various measures have been urged as of particular value; such, for example, as a diet which is high in proteins and low in fats. The special treatment that has been given more consideration in late years than any other has been that of Fischer. In this the patient receives every possible attention with regard to general care. The particular feature of this plan is the use of alkalies and sodium chloride. The Fischer solution is made by dissolving 10 Grammes of crystalized sodium carbonate and 14 Grammes of sodium chloride in 1000 cc. of water.

In selected cases the specially prepared solution is given intravenously. This is made by dissolving 10 Grammes of crystalized sodium carbonate in a little sterilized, distilled water, and 14 Grammes of sodium chloride is then dissolved in distilled water and sterilized by heat. After this has cooled sufficiently the first solution is added to it, and the total amount made up to 1000 cc. In preparing to use this, it would be advisable to have recourse to the writing of this eminent authority.

General Care.—This is one of the most important considerations in the whole scheme of treatment.

Rest. In most cases this should be absolute, both mental and physical. This means that the business man should be relieved of his responsibilities and the housewife of her domestic duties. It means the exclusion of noises, confusion, and unnecessary company. As convalescence is established, the return to activity should be gradual, properly regulated, and its effect carefully noted. In many cases the circumstances may be such as to render strict confinement impracticable, but it is certainly the ideal plan.

Treatment Quarters. As the patient is probably in for a siege of considerable duration, arrangements should be made accordingly. The room should be selected from the standpoint of quiet, ventilation, heating and lighting. These will, naturally, have to be influenced by the season of the year. It should be remembered that this is a condition in which the proper amount of fresh air is essential, but a room in which an equable temperature can be maintained is also of the greatest importance.

Clothing and Covering. In cold weather woolen garments and blankets for covering are desirable. Even in warm weather care should be taken to prevent exposure of the skin. The tendency of many patients is to stay covered until they become too warm and moist with perspiration, and then to throw off the covering and cool off. Such action as this should be carefully avoided.

Frequent Examinations. Throughout the progress of the case, and for that matter for a long period afterwards, repeated examinations should be made of the blood and urine, and the condition of the kidneys determined by function tests.

Diet. Here, as in all cases of illness a certain amount of individualization is necessary particularly with regard to the duration of diet restrictions. We have to be guided by the state of nutrition of the individual, by the demonstrated ability to handle food, and by the progress of the disease. For example, in the presence of continued disease, the amount of nutrition will, have to be increased necessarily. Many types of diet have been suggested but the following usually meets all requirements. Milk is the main stay. In the presence of high fever it may be diluted with barley water; otherwise, given plain. The amount will depend largely upon the state of nutrition of the patient and the ability of the individual to handle liquids (as evidenced by the presence or absence of edema). Under most circumstances the patient can be given the entire fluid intake as milk. Where the edema is marked, it may be inadvisable to give enough liquids to meet the nutritional requirements; in which case, other articles of food may be added, as toast, soda crackers (not saltines), zwieback, cream of wheat, farina, soft rice, and butter. In the case of young children milk may not be well tolerated at times, particularly in the presence of fever. If the child is accustomed to some simple carbohydrate food and, if this particular food has no objectionable features, its use may solve the nutritional problem for a time.

If the condition of the patient justifies it, articles of diet other than milk may be allowed, such as toasted soda crackers, zwieback, soft cereals served with milk and sugar or butter. Later may be added baked or mashed potatoes, toasted light-bread, selected fruits, and many of the common vegetables.

While a low protein diet is usually regarded as desirable it has been demonstrated that there is no necessity to restrict indefinitely the taking of simple meats, so as the convalescence progresses, such articles as poultry, baked fish and breakfast bacon in moderation may be added. It will be noted that the milk and cereal diet furnishes proteids in a certain amount and apparently enough to meet the usual requirements. In all of these cases, the diet should be carefully regulated for many months, so as to avoid too much in the way of proteids and renal irritants such as spices and alcoholics.

It is recognized that this diet suggested leaves out many articles that might have been included with impunity; it is given merely as a working basis.

Special Measures. Purgation. The main consideration here is to prevent any unnecessary burden being put on the kidneys by the absorption of toxins, and to lessen the normal work of these organs. It is desirable, therefore, to keep up a moderate intestinal activity and this is best accomplished in most cases by saline laxatives. These not only maintain the proper elimination of solid material but also of fluids. Magnesium sulphate, sodium sulphate or phosphate, or one of the purgative waters may be used. In the case of children, milk of magnesia is satisfactory. It is not desirable to produce violent purgation that will inconvenience and exhaust the patient. About two or three bowel movements per day is proper for the average case. The following prescription may be used:

℞		or
Potassii Bitartratis,	℥j	30|0
Sodii Sulphatis,	℥ij	60|0

M.
Sig.—Teaspoonful in water early each morning.

This may be given in a small amount of some diluted fruit juice.

The extent of the purgation will depend largely upon the amount of edema or the threat of some grave condition, as uremia.

Sweating. Under all circumstances it is desirable to keep up a certain amount of skin activity, but in many cases it is inadvisable to produce definite periods of sweating by special measures. These may be resorted to in the effort to relieve edema, ward off threatened uremia, or in the treatment of some other complication. The sweating process may be carried out by any one of the methods in common use. It is necessary to have a cold application to the head. One of the most satisfactory methods is the electric light bath. These can be obtained at practically any institution or, in private practice, rented or bought from dealers. Where the necessary apparatus for this is not obtainable, the use of the hot, wet packs may be employed. In these the patient is wrapped in a blanket wrung out of hot water and then wrapped in a dry blanket and covered with oilcloth or rubber sheeting. Oilcloth or rubber sheeting is, of course, used under the patient to protect the mattress. During the application of the wet pack, hot water bottles may also be used. In many cases sufficient perspiration may be induced by the simple application of hot water bottles or an electric pad, and the patient covered with a blanket. The duration of the sweating process must depend on the condition of the patient and his reaction to this measure. From fifteen to sixty minutes is the usual time. After the sweating, care should be taken to avoid chilling by exposure. Any of these measures are facilitated by the administration of a hot drink, as hot lemonade or hot malted milk. Pilocarpine is often used here where the necessary amount of sweating is not easily induced. It is particularly contra-indicated in the presence of coma, pulmonary edema, or a decompensated heart. It is a dangerous drug.

Cupping and the Use of Leeches. Cupping and the use of leeches to the kidney region have been used for generations. They probably have a field of usefulness.

Venesection. This is sometimes a life-saving measure. It may be used either to remove blood alone or to remove blood and inject some other material, as glucose solution, into the circulation. Some recommend that the blood be removed from a vein in the foot, as this may lessen pressure in the inferior vena cava. Removal of blood is particularly indicated in the high pressure cases. Transfusions have been employed by many with apparent benefit.

Symptomatic Treatment. Edema. This is best controlled by the use of hydrogogue purgatives, sweating, and the limitation of liquids and salt, as previously outlined. These measures have been discussed previously. In the presence of marked edema, it may be necessary to restrict the fluid intake and, under all circumstances, the balance between intake and output of liquid should be carefully noted. The fluid intake should seldom be limited, even for a short period, to less than a pint per day, and usually a reduction to two pints per day will meet the requirements. In the restriction of salt also, it is advisable to be influenced by the symptoms. In selected cases the patient may be given a salt free diet, but in most instances a limited salt intake will meet the requirements.

Diuretics are seldom, if ever, advisable except in such cases as complete suppression or uremia; and even then their value is questionable. In certain cases digitalis by its indirect action may be of value. It should be used in sufficient amount to produce definite results.

Headache. This symptom is probably best relieved by the general care of the patient, such as rest and elimination. Where medication is necessary codeine is probably the safest agent. It should be used only in sufficient amount to meet the definite requirements.

Nausea. The principal element in the prevention and treatment of this symptom is the general care of the patient as previously outlined. Where the symptom requires special attention, a certain amount of relief may be obtained by hot applications to the epigastric region and the use of small amounts of carbonated waters.

In some cases results may be secured by giving small amounts of milk and lime water; for example, one tablespoonful of lime water and three tablespoonfuls of milk every thirty minutes until the symptom is under control. Where medication is necessary, sodium bromide in 15 to 30 grain (1 to 2 Gm.) doses repeated every two or three hours may be tried out. This symptom usually subsides as the condition of the patient improves.

Anuria. The general care of the patient as previously outlined will do much to prevent the development of this condition. The treatment is rather unsatisfactory. Hot drinks, hot packs and hot irrigations, or measures of this kind, sometimes seem to be of benefit. In certain cases digitalis is of value.

Theobromine sodiosalicylate, 15 grains (1 Gm.) every three hours for several doses, is probably the safest pure diuretic that may be used. What has probably been a life-saving measure in many cases is the intravenous glucose solution. From 300 to 500 cc. of about a 30 per cent solution is usually employed. These matters will be discussed in detail under the head of the treatment of uremia.

Convalescence.—There are few conditions in which convalescence should be more carefully supervised. The patient should always be kept under observation for a period of months or years. The general condition of the patient should be carefully noted and recorded, the urine examined, and the function tests used sufficiently often to keep in touch with the condition of the kidneys.

Surgery.—Surgical measures, such as decapsulation, occasionally have a place in this treatment.

Complications.—The principal complication is uremia. This will be discussed under a separate head.

CHRONIC NEPHRITIS AND NEPHROSIS

As will be noted from the classification of kidney diseases on page 354, there are included in this group the chronic and end stages of nephrosis, the chronic and end stages of diffuse nephritis, and the chronic stage of focal nephritis. As the etiology and treatment of these conditions are so nearly the same they will be discussed as a whole and attention called to those differential features that are of particular interest.

Etiology.—The cause of chronic kidney disease is largely the same as that of the acute. The chronic condition is naturally in most cases a perpetuation of an acute process, on the other hand there are certainly many cases the beginning of which could hardly be classed as acute. This is particularly true of that type of case that results from what has been described as "repeated small insults," such, for example, as continued exposure, fatigue, mental strain, improper diet, or such slowly acting diseases as tuberculosis, syphilis, and chronic suppurative foci. These causes may result either in a true acute process or in one that is so gradual in its development as not properly to come under the head of acute disease.

Incidence.—Diseases of this group usually develop in early middle life, being progressively less frequent after forty or fifty years of age. As a whole, nephrosis occurs later than nephritis. Men are more commonly affected than women.

Course and Prognosis.—These conditions are essentially resistant to all measures of treatment, and tend to persistent and progressive disability, though they usually show periods of marked remission. Of course a large percentage of cases are cured, though a certain amount of kidney damage remains.

Symptoms and Diagnosis.—As previously stated, nephritis and nephrosis are divided into acute, chronic, and end stages (or courses). There is no sharp line of demarcation between these, as they are essentially different stages of the same pathological process. Many of the outstanding symptoms of the chronic and end stages are merely a perpetuation of those of the acute process, therefore, the symptomatology is to a large extent the same. (See page 356.) Usually the symptoms of the end stage are merely an accentuation of those found in the chronic stage, or special symptoms resulting from progressive damage. As an illustration a slight edema may be present in acute nephritis, this would, naturally, have a tendency to be more pronounced in the chronic stage and still more marked in the end stage of the disease. In other words, the symptomatology of the various stages is often more a matter of degree. In building up a diagnosis, the following factors are of importance.

History. Of particular interest is the history of preceding kidney involvement; also of the presence of any of those conditions known to produce kidney damage. Of course many other factors must be considered, such, for example, as family tendencies, vocation, and environment.

Onset. This is variable. In a large percentage of cases the onset is gradual. There is a slowly increasing disability and sense of discomfort that finally sends the patient for medical investigation. In a large number of these cases the chronic process can be traced directly from acute kidney disease.

Edema. This also is a variable symptom, and in many cases it may be slight throughout the course of the disease, particularly in the inflammatory type (nephritis). In the degenerative type (nephrosis), edema is usually a marked symptom. In the chronic and end stages edema may be either of renal or cardiac origin, the principal differentiation, particularly in the ambulatory cases, being that the kidney type is more of a morning and the cardiac more of an evening edema. In the late stages, particularly with cardiac insufficiency, there is apt to be extensive edema, including such developments as ascites and hydrothorax.

Pain. More or less headache is a fairly constant finding, particularly in the high blood pressure cases. It is more marked in the morning and often is complained of as a dull discomfort rather than an actual pain. At times the pain may be intense.

Backache. The manufacturers of the patent kidney remedies have stressed backache as a symptom of kidney disease to that point where the laity associates this type of pain with Bright's disease, while as a matter of fact, a large percentage of these cases run the entire course without any discomfort referred to the kidney region. Local pain is rather constant in pyelitis, less apt to be present in nephritis, and largely absent in nephrosis.

Chest Pain. This is sometimes a cause of complaint, particularly in the later stages of the disease, it probably results largely from the excessive respiratory action and the cardiac involvement.

Abdominal Pains. These are occasionally encountered particularly in the later stages.

Gastro-intestinal Symptoms. Among the most prominent of these are anorexia, nausea, vomiting, and diarrhea. Under certain conditions, as with diarrhea and polyuria, thirst may be quite pronounced. Nausea and vomiting are fairly constant symptoms sooner or later in practically all progressive cases. At times the condition may be quite disturbing and not only cause marked discomfort, but interfere with the patient's well-being by preventing the taking of nourishment, rest, and sleep.

Nutrition. There is a decided tendency to loss of flesh; this, at times, may be obscured by edema. The loss of flesh is more pronounced in those cases in which gastro-intestinal disturbances are prominent. Many cases, however, maintain a fair state of nutrition.

Weakness. Sometimes the first symptom noted by the patient is a loss of strength and endurance. In the chronic cases this often becomes quite marked.

Dizziness. This is one of the early symptoms. While it is apparently absent in some cases, still many patients first seek medical advice for this particular cause.

Hemorrhage. There are at times such hemorrhagic evidences as hematuria, epistaxis, hemoptysis, menorrhagia, and sub-cutaneous hemorrhages. These are more apt to be present in the high blood pressure cases (nephritis) and are usually manifested late in the course of the disease.

Anemia. The tendency is to a progressively developing anemia. During the chronic stage, it may be very slight or absent; during the end stage it is usually quite marked.

Nervous Phenomena. Such symptoms as insomnia, irritability, hyperesthesia, and nervous twitchings are quite common; their frequency is somewhat in the order listed. Insomnia and irritability are often sources of much trouble and tend to be rather persistent.

Skin and Hair. In the later stages, particularly, there is a tendency to dryness of the skin and hair. Quite frequently there is a marked loss of hair.

Heart. Sooner or later there is a cardiac hypertrophy in nephritis; sometimes this is quite marked. Coincident with this there is a tendency to the development of murmurs, accentuation of the second sound, and palpitation.

Myocardial Insufficiency. In nephritis this is one of the most serious complications encountered. The early evidences are shortness of breath and dyspnea on exertion. Later there may be edema of circulatory origin and a varied train of other symptoms attributable to the cardiac involvement.

High Blood Pressure. Nephrosis shows no elevation. Nephritis tends essentially to high blood pressure.

In the early stages, particularly, this may present quite a wide range of variation, at times being normal and at other times showing a decided increase. The tendency to remissions is less as the disease progresses and in cases of long duration this often becomes quite marked.

Eye Grounds. In nephritis sooner or later the fundi show decided changes. In the end stages particularly this may be pronounced. In fact it is not unusual for a diagnosis of kidney disease to be made first by the occulist.

Odor of Breath. In the late stages as the evidences of uremia develop the breath may have a distinctly urinous odor.

Blood Chemistry. Evidences of faulty kidney function sooner or later will be found upon blood examination, particularly in nephritis.

Basal Metabolism. The tendency is to an increased reading, particularly in those cases showing marked dyspnea.

Urinalysis. The amount of urine will naturally vary, depending upon the particular type of involvement, and the stage of the disease. The albumin varies, but at times is high, particularly in nephrosis. Casts may be found. Blood is a fairly constant finding in nephritis, less frequent in nephrosis. In the latter condition, it is usually absent, at least macroscopically.

Function Tests. In dividing nephritis into the chronic and end stages, the differentiation is based on the impairment of function; therefore, when considered in this way the true chronic stage shows little or no impairment by the function test, while the end stage shows impairment in varying degree. The phenolsulphonephthalein test indicates a lowered elimination; the two-hour function test shows more or less marked fixation of specific gravity and increase in the night as compared to the day output. Other function tests show more or less impairment, depending upon the stage of the disease and the type of involvement.

A characteristic of nephrosis is the slight impairment shown by any of the common function tests.

Differential Diagnosis.—A consideration of all the available data usually leaves little doubt as to the presence of kidney disease; the consideration is more as to the extent of the involvement, the type of involvement, and the presence or extent of such complications as cardiac or hepatic damage.

Prophylaxis.—As stated under the discussion of the acute disease, prophylaxis consists essentially in preventing those conditions that are known to lead to kidney involvement; and when those conditions are present to remove them as promptly as possible and protect the kidney against damage during the treatment.

An essential factor in prophylaxis here as elsewhere is keeping the human body in the best possible state of health by wholesome living;

the proper balance between work, rest, and recreation; and the freedom from all forms of dissipation. Another important consideration in the prevention of these chronic processes is the prompt, intelligent, and persistent treatment of the acute kidney diseases and the continued observation of such patients.

Treatment.—The first essential in treatment is the removal of the cause or proper attention to the cause if such can be located. The acute exacerbations which occur are managed as outlined under the treatment of the acute disease. (See page 358.)

Uremia, which is likely to develop sooner or later, will be discussed under a separate heading. (See page 375.)

The treatment here will, refer therefore, to the routine and symptomatic management in the ordinary course of the disease. There are no specific measures and medication is always symptomatic.

General Care.—This is the main essential in the management of these cases. It is a long, continued process and sometimes throughout many years of chronic kidney disease the patient may be maintained in useful activity.

Rest. In practically all cases a certain amount of restriction of activity is indicated. For the more seriously ill, rest in bed is, naturally, essential; others are best handled as chair cases, and many as ambulatory cases with only certain restrictions. For example, a man in this last group, if he be a physician, had best get an assistant to do the night work and to relieve him in unfavorable weather. In all of these cases an increased amount of rest is indicated; that is, they must get up later in the morning, go to bed earlier at night, and lie down in the middle of the day. They should avoid particularly any unusual strain and those activities that subject them to exposure.

I remember one case that had been doing well under modified restrictions, was continuing a certain amount of activity and supporting his family in comfort. He went on a deer hunt in the middle of winter during a cold stormy season; not content with taking a stand, he floundered through a thick swamp on foot as one of the drivers with the dogs. On coming out, he got in an open launch and came twenty miles through the rain and sleet and with the spray from the waves dashing over him. He lived only a few days.

Clothing and Covering. These patients should be kept comfortably warm. They are the ones who must avoid drafts or rapid cooling when overheated. They should be consistent users of overcoats, and in fact, learn the value of every phase of protection.

Baths. Warm baths are decidedly indicated.

Excitement. Any mental strain or long sustained anxiety reacts unfavorably. Very often much can be obtained by the physician having a heart to heart talk with the business associates and the family of the patient, and arriving at a definite understanding as to cooperation necessary on the part of all concerned, in the matter of taking care of the patient.

Bowels. Constipation should be rigorously avoided. On the other hand exhausting purgation must never be permitted. The patient should be properly instructed in how to maintain a sufficiently regular intestinal elimination.

Diet.—There are several factors to be considered in arranging a diet. Among these are the state of nutrition, the digestive ability, the presence of absence of edema, the condition of the kidneys as evidenced by renal function, and the blood pressure. It should be remembered that chronic kidney disease may persist for years and sufficient nutrition must often be arbitrarily maintained. If water is well handled, as shown by the absence of edema, and if the blood pressure is not excessively high, there is no necessity for restricting the water intake. These patients should, as a rule, be milk drinkers, and in many cases milk can be the main article of diet and the balance built to it. This particularly applies to those cases that show no evidences of contra-indication to fluids. Where they are taking sufficient milk, the necessity for proteid intake is largely cared for. In addition to this, fruits and cereals and simple vegetables, as potatoes and carrots, may make up all of the necessary nourishment. Other foods may be added, largely to give variety. The average patient may take almost any simple, well-prepared food, such as poultry, fish, steak, bacon, eggs, in fact, the diet may be so arranged that the individual will hardly feel the restrictions. In all of these cases, however, the first consideration should be kept in mind, that is, milk and milk products should be given first place. Next place should be given to cereals, fruits and vegetables. No spices or highly seasoned foods should be used. Nothing should be given that will make a tax on the digestive ability. The day's nutrition should be divided into three or more meals instead of one or two, as is so often the case. Food should be eaten slowly and chewed well. The chewing facilities should be kept in the best possible condition. Not only should the case be individualized as to food, but the list changed whenever indicated. For instance, during periods of exacerbation, the diet should be promptly carried back to that of acute kidney disease.

Symptomatic Treatment.—From time to time it is necessary to give special attention to various symptoms that arise. Among these are the following:

Edema. The treatment required will depend principally on whether it is renal or cardiac in origin. The treatment is essentially the same as that discussed under the head of acute kidney disease. It will be remembered that the fundamentals are rest, proper elimination by bowel and skin, restricted liquids and salt, and stimulants as indicated.

Pain. The headache that is so frequently associated with this disease may often be relieved by rest and elimination. It will be found that nearly all of these cases of headache are coincident with a rise of blood pressure. This type particularly responds to those measures (as rest and elimination) that tend to lower the pressure.

While the salicylates as a rule are contra-indicated in this type of disease, occasional doses of acetylsalicylic acid are certainly justified at times. For severe headache codeine may be employed. For the persistent, dull discomfort that fails to respond to general care, the bromides are often of value. It should be borne in mind, however, that the main efforts for the relief of this condition should be directed to its control through non-medicinal management.

The backache, and abdominal pains can be relieved usually by simple care, such as rest, quiet, careful diet and proper elimination. When these fail, the same medication as suggested for headache may be employed.

Gastro-intestinal Symptoms. The loss of appetite is very often a conservative process of nature and in many cases when the patient is able to handle food, he will desire it. It is seldom advisable to resort to tonics.

Nausea may usually be best treated by the measures discussed under general management, such as rest, diet, and proper elimination. At times heat applied over the epigastric region or an ice bag to the head will be of value. Where these fail, bromides are probably our most satisfactory agents. In many cases such drugs as sodium citrate or bicarbonate are employed with the bromides; these may be given by mouth or rectum. (For the general management of nausea see page 437.)

Nervous Phenomena. These are usually the result of toxemia or high blood pressure, and measures directed to these conditions will, naturally, influence the nervous symptoms. Of particular importance are rest (both mental and physical), diet, and elimination. It may at times be necessary, in order to secure sufficient sleep or to aid in giving relief, to have recourse to the bromides, barbital, or codeine. These should be used only for temporary effect.

Hemorrhage. Hemorrhage of any type, whether from the kidney, nose, or elsewhere calls for rest and increased attention to every detail of the patient's condition. Various agents such as normal horse serum have been recommended. They will seldom be found necessary or of value here. By far the greatest percentage of hemorrhages occur as epistaxis with hypertension, and in most instances it is probably a conservative process of nature. It should be the rule before taking any steps to check such, to determine the blood pressure and, if it be found excessively high, the patient can be quieted with the assurance that loss of blood is a conservative process and of actual benefit, and effort to control it should be made only if the loss should be excessive.

Anemia. This condition is met largely by the proper attention to diet, fresh air, and those other measures that work toward maintaining a proper standard of nutrition. When medication seems necessary, iron may be used in the form of the carbonate or any of the common preparations that the patient can well tolerate.

Myocardial Insufficiency. This calls principally for vigilance in the general management, particularly looking to rest, freedom from excitement, and proper diet. These measures meet all the requirements in many instances. This will be discussed more in detail under complications.

High Blood Pressure. A certain amount of elevation of pressure is usually a conservative process and does not call for any effort to combat it. When the pressure reaches a point where it begins to give rise to inconvenience, or to constitute a threat, it should receive attention. The principal methods of management are those that were discussed under general care. In many cases sufficient rest and protection against unusual excitement, and proper attention to the diet and elimination will meet the requirements. In chronic nephritis it will be found that there is a tendency to periods of exacerbation of the pressure, while for other long intervals it will not give rise to any inconvenience. During these periods of exacerbation, it may be necessary to institute absolute rest, the duration and frequency of these rest periods depending on the evident requirements and response to the measure.

When the portable blood pressure outfit first came into use, there was a tendency on the part of the profession to try to force all pressure down to normal and much inconvenience was entailed and probably much damage done. It is understood now as necessary to individualize each case and be guided by the sum total of clinical evidence. It is seldom justifiable to use nitroglycerin or sodium nitrite except for emergency. Small doses of iodides have probably proven the most useful drug and the results are spectacular in some instances. From three to ten grains total per day of sodium or potassium iodide associated with proper attention to the details of general care will constitute all that is necessary, or at least advisable, in the vast majority of cases. This matter will be further discussed under the treatment of uremia and sclerosis, pages 373 and 375.

Anuria. Complete or partial suppression of urine is often encountered particularly in the end stage of kidney disease. It is a symptom of grave import and in many cases little can be done in the way of relief. This symptom usually manifests itself in conjunction with other unfavorable phenomena indicating a serious condition. One of the first considerations here is to try to carry on at least a certain amount of elimination through the bowel and skin. Modified hydrogogue purgation and sweating are usually indicated. The condition, of course, calls for restricted intake of food, so as to leave less in the way of metabolic products to be disposed of. It is, of course, understood that all of the plans of general care will receive due attention. Among those measures that have been recommended and that at times prove of value are hot applications to the kidney region; dry cupping; colon irrigations and intravenous administration of various solutions (as glucose or Fischer's). The use of diuretics at times has seemed of value and in the face of this grave complication they may be tried. Probably the most satisfactory is theobromine sodio-salicylate in doses of about 15 grains (1 Gm.) every three hours until six or eight doses have been taken. Digitalis may help, particularly in those cases associated with heart involvement.

Complications.—A great many complications are possible such as pneumonia or meningitis. They can be treated as the same conditions developing from other causes.

Uremia. This is discussed under a separate head. (Page 375.)

Acute Decompensation. This is discussed under a separate head. (Page 328.)

RENAL SCLEROSES

General Statement. Definition.—As previously stated the group of non-pyogenic kidney diseases is being discussed in these articles under three general heads: The degenerative (nephrosis), the inflammatory (nephritis), and the sclerotic. The first two of these were discussed in a general way as acute and chronic. The scleroses are sub-divided (McElroy and others) into: (1) Benign hypertension, or the condition characterized by sclerosis of the renal vessels; (2) Malignant hypertension, which is a combination of the above and nephritis.

The benign hypertension is the group of particular importance. This will be discussed here in full, and then attention briefly directed to the points that differentiate it from the malignant type.

Incidence.—This is essentially a disease of mature age; comparatively young adults may be effected, but the majority of cases are well past middle life.

Etiology.—As this is a condition depending upon the arteriosclerotic changes in the vessels of the kidney, any factors that contribute to a general arteriosclerosis are, naturally, of importance in the etiology of this disease. Among those is a family tendency; that is, a patient may inherit circulatory equipment that is not competent to meet the sustained demands made upon it by the various processes of life. Occupation and environment or factors that produce worry or prolonged mental strain may have an influence in the etiology of these cases. Physical labor seems to be of less importance. Chronic foci of infection unquestionably play an important role. Many other factors, such as dissipation and intestinal stasis, may be classed among the contributing causes.

Course and Prognosis.—The condition is essentially chronic and while the immediate outlook in the average case is not urgently serious, it must be recognized that the damage that has been done can not be entirely repaired. McElroy divides these cases into three groups from the standpoint of prognosis: (1) Those in the early stages that possibly may be cured; (2) The more advanced cases that may be arrested; (3) Late or severe cases where many of the symptoms may be palliated. Among the most unfortunate features that must be considered in prognosis are the lessened resistance that these patients may have to other diseases and the tendency to cardiac complications.

Symptoms and Diagnosis.—In certain stages of the disease the diagnosis is comparatively easy. The difficulty arises when the condition is complicated by the development of other factors. It then often requires extended observation and the careful evaluation of all clinical data.

History. Of considerable importance here is the family history and the record of the existance of those factors that are known to be operative in the production of this disease.

Onset. As a rule the development is gradual and in many cases the patient is not conscious of any abnormal condition until he develops some of the later symptoms, such as cardiac insufficiency. Many cases are discovered in life insurance examinations or routine investigations for other purposes.

State of Nutrition. This is usually unimpaired. In fact, it is the heavy, red-faced, full-blooded type of individual that is most apt to show the disease. Later when complications set in, there naturally is more or less impairment.

Pain. One of the symptoms that is most apt to send the patient for investigation is a tendency to headache. There may be periods of severe headache, sometimes of the migraine type or only a tendency to a persistant, dull discomfort. Other pains such as angina pectoris will be discussed under a separate head.

Dysuria and Polyuria. These are fairly common, sometimes being the conditions that first call attention to the fact that all is not well.

Edema. In uncomplicated cases edema is not a pronounced symptom, and is often absent throughout the entire progress of the disease. When cardiac insufficiency develops, edema may be pronounced.

Cardiac Insufficiency. The usual train of symptoms resulting from this condition are the most pronounced evidences in the symptomatology. Among these are shortness of breath, particularly upon exertion, palpitation and the various other indications of abnormal heart action; a sense of oppression or constriction in the chest; insomnia or a sleep that is disturbed by unpleasant dreams; periods of dyspnea, asthmatic in type, particularly at night; throbbing in the ears, particularly when the patient is in a recumbent position. In this group should also be included such symptoms as edema and enlarged liver.

Heart Findings. The heart is sooner or later enlarged. There may develop any of a variety of murmurs or any of the various arhythmias.

Vessels. The palpable vessels sooner or later evidence arteriosclerotic changes. The veins, particularly about the neck may show considerable fullness and pulsation.

Blood Pressure. This is one of the characteristic findings. High blood pressure is essentially the rule. In the earlier stages there will be periods of remission in which the pressure may be found normal, but the tendency to high pressure is constant.

Psychic Phenomena. These usually begin as a loss of poise and mental efficiency. Later more pronounced changes may develop.

Hemorrhages. There is a distinct tendency to hemorrhage, this finding expression particularly in epistaxis. In women there may be menorrhagia or metrorrhagia.

Angina Pectoris. Fortunately this develops in only a comparatively small percentage of cases. It is one of the conditions that must be considered as a possibility.

Eye Grounds. In uncomplicated cases the findings are those of arteriosclerosis.

Laboratory. In uncomplicated cases the blood does not show any changes. The urine may be normal or may show evidences of kidney damage, though these are usually not marked in character. In the benign type of this disease the function tests are usually unimpaired.

Differential Diagnosis.—The principal difficulty lies in differentiating this disease from some of the late stages of nephritis and in establishing whether the condition is a pure benign hypertension or complicated by a degenerative or inflammatory process. These can be worked out only by a careful consideration of all the available data.

Prophylaxis.—The principal measures in the way of prevention are, naturally, those directed at maintaining a satisfactory state of well-being. These include a proper adjustment of work, recreation and rest; the avoidance of prolonged mental strain; the avoidance of dissipation; the clearing up of chronic infections; and due attention to those various and sundry other matters that are known to play a part in the etiology of this condition.

Treatment.—In caring for these cases there are two extremes that must be avoided. One is the tendency to neglect; there is a disposition on the part of many to feel that nothing can be done and, therefore, all effort at relief is useless. The other extreme is over-attention especially too many restrictions. There are many cases where the life of the individual is made a burden by a multiplicity of restrictions and persistent medication. In the majority of cases there is a happy medium that can be followed that will tend to lessen further damage and aid in compensating for that already done, while at the same time the patient may be allowed to pursue a comfortable and useful existence. There is no specific treatment.

General Care.—The necessary attention is indicated by the physical condition of the patient and the circumstances under which he has to live. Rest is certainly a factor of major importance. It should be mental and physical; of the two, mental rest is probably the more essential. Some cases require a prolonged rest in bed, others only occasional periods, and many others only certain restrictive measures. The condition is most apt to develop late in life and among those who are intellectually active. All that is necessary in a large percentage of cases is to have the individuals so adjust their responsibilities that they can get more rest in bed, more mental diversion, and longer periods of vacation. For example, if the patient be a physician he can give up some of his more strenuous work by securing an assistant or a junior associate. The recreation should be of a character that will not call for violent activity. In other words the individual should be instructed as to the necessity of leading a comfortable and placid existence. Suggestion is an important factor here, and very often much in the way of mental strain can be avoided by encouraging the individual in the employment of a little more philosophy in meeting the daily affairs of life.

Baths. Cold baths should be avoided, and warm or tepid baths used exclusively.

Bowels. The bowels should be kept comfortably active without violent purgation. Constipation is certainly a contributing factor in the production of this condition and will materially interfere with the favorable progress of the case.

Weight Reduction. When the patient is overweight, reduction should be considered. It lessens the burden on the circulatory apparatus, and directly and indirectly reduces the work of the kidneys.

Diet. If the kidney function is good there is little in the way of restriction to be imposed, except when a weight reduction is indicated. In a general way patients should avoid food that is hard to digest and food that is highly seasoned. While meats may be allowed, they should not be indulged in to excess. The food should be carefully prepared, slowly eaten, and thoroughly chewed. Three moderately small meals should be eaten a day rather than one or two large ones. The use of milk products, cereals, fresh fruits, and fresh vegetables should be increased. The digestive peculiarities of the patient should be investigated and the individual warned against taking the articles that are known to be a source of trouble.

General Medication.—As there is no specific treatment, medication is almost entirely symptomatic. There was a tendency at one time to the extensive use of nitroglycerin and sodium nitrite; these drugs are now limited to emergency use. Probably the most satisfactory routine medication is the use of small doses of iodides. The best results are probably obtained by employing a total of five to ten grains (0.3 to 0.6 Gm.) a day; this may be used with periods of intermission. Large doses of iodides are employed by many but the small doses have seemed to give better results.

Symptomatic Treatment. Headache. This is best relieved by the measures discussed under general care, such, for example, as periods of rest, freedom from worry, and proper elimination. Acute attacks may be relieved by acetylsalicylic acid or codeine or both. The prolonged periods of dull discomfort often respond to comparatively small doses of bromides, such as fifteen grains (1 Gm.) twice a day until relieved. As the condition is chronic, the medication for the relief of headache should be employed only to meet the immediate requirements and as secondary to the simpler measures of general care.

Hemorrhage. Hemorrhage of any type calls for rest. Very often the loss of blood is a conservative process on the part of nature, and before medication is given, the general condition of the patient, particularly the blood pressure, should be investigated. A nervous patient can often be quieted by the explanation that a moderate loss of blood is an effort on the part of nature to give relief and prevent damage. Sometimes the bleeding may be so severe as to require heroic measures; for example, a violent menorrhagia may require hysterectomy.

Edema. In the benign sclerosis edema is not often a factor, except when it is of cardiac origin. The treatment of edema, therefore, would be the usual treatment for cardiac insufficiency.

Cardiac Insufficiency. This calls for rest, restricted diet, cardiac medication and such other care as would be employed in cardiac insufficiency arising from any other cause. Particular attention should be given to those measures looking toward the relief of high blood pressure.

Complications.—Among the most important of these are cerebral hemorrhage, mental disturbances, and cardiac decompensation. Special measures for their relief would be the same as in these conditions arising from other causes.

MALIGNANT HYPERTENSION

As previously stated, this disease is benign hypertension plus nephritis. This is the condition giving the highest blood pressure and in which, in fact, there are the combined symptoms of the two diseases that go to make up the process. The symptoms of hypertension may predominate at one time and those of nephritis at another. The treatment is essentially the same as for the late stages of chronic nephritis. (See page 367.) The treatment is, naturally, largely symptomatic. The outlook is uniformly grave.

UREMIA

General Statement. Definition. This term is used to designate a more or less imperfectly defined group or groups of symptoms resulting from one or more of several causes having as a background impairment of the kidney function. The exact cause of the phenomena presented is still a matter of discussion, and it is probable that many different factors may be operative singly or together.

Various classifications are in use. The one that seems to meet requirements best from the standpoint of a discussion of treatment is a modification of that of Reiss. This grouping may be stated as follows:

First, the convulsive type or that in which more or less definite convulsive seizures take place.

Second, the asthenic type or that characterized by weakness, prostration and coma.

Third, the psychic type, or that characterized by restlessness, irritability, insomnia, delirium and hallucinations.

It is, of course, understood that in a large percentage of cases the manifestations are not confined to any one of these types; that is, we have what Reiss classifies as the mixed type. At times also the evidences change so that, a patient for example who starts out as an asthenic or psychic type may develop into the convulsive.

Incidence.—Until within comparatively recent years the medical profession generally recognized the convulsive type only as uremia. Frank convulsions are relatively rare as compared with uremia as a whole. As the term is understood now to embrace many other conditions it is, of course, more commonly met with. It may affect all ages and conditions of people, but naturally falls within the periods of the incidence of the various types of kidney disease. It is, therefore, more frequent in the second and fourth decades. The tendency to uremia may be well measured by that of the kidney conditions responsible for its development.

Etiology.—Uremia should be considered not as a distinct disease, but as a development of or complication resulting from various types of kidney involvement. This is more fully discussed under the head of these particular conditions.

Course and Prognosis.—While of course many patients go on to recovery, at the same time the outlook is extremely grave, at least for any extended period of life expectancy. A large percentage of patients do not realize their condition until they have already reached that stage of impairment where complete return to normal is not to be expected.

Symptoms and Diagnosis.—As previously suggested, there are various types of uremia that may be more or less clearly defined; also as the condition develops in the course of, and as the result of different diseases, it naturally obtains that many factors have to be taken into consideration in building up a diagnosis and in deciding whether or not this particular condition has developed. A diagnosis not only of uremia but of the type is of importance, both from the standpoint of treatment and of prognosis. Cases with frank convulsions or other definite phenomena present less difficulty than those of insidious onset and indefinite manifestations.

The effort will not be made here to discuss the diagnosis of each type independently, but only to give some of those symptoms that indicate uremia; and the particular type may be fairly well indicated by the predominance of certain of these evidences.

History. Of particular importance in causing us to suspect this condition is a history of renal involvement of a type known to lead to this condition. These matters were discussed more in detail under the head of kidney diseases.

Onset. This is markedly irregular. Some cases are fulminating in type, convulsions and coma being the first evidences noticed. Others are more gradual in developing, sometimes showing increasing symptoms throughout quite a long period. This is particularly true of the psychic and asthenic types.

Convulsions. This is a condition that is best understood as an evidence of uremia and is the particular manifestation that leaves little doubt as to the presence of this condition. Convulsions may be any one of several types, and they may show varying degrees of severity. A single convulsion does not usually result in death, but there is a marked tendency to repeated seizures once this condition has developed. One of the most common types is the epileptiform; and very often it is hard to establish a differential diagnosis until an opportunity is had for observation and investigation. The convulsive symptoms often take the form of a localized involvement of certain groups of muscles.

Eclamptic Equivalents. These embrace such phenomena as disturbances of vision or hearing, paralyses, muscular twitchings, migraine and various psychic phenomena.

Headache. This is one of the most constant symptoms and is usually found in all of the types. It may be paroxysmal and violent or it may be of a more or less dull, aching character. It is often one of the early manifestations, and in those cases that are known to be in a state where uremia is a possibility, headache should be one of the symptoms looked for and accorded sufficient importance.

Gastro-intestinal Disturbances. These are usually quite marked and include such symptoms as anorexia, nausea, vomiting, hiccough, diarrhea and abdominal pains. Nausea and vomiting are symptoms of considerable importance in establishing a diagnosis, as they are so frequently encountered in the various types. In those cases where the development of uremia is suspended, it is a good custom to especially instruct that any tendency to headache and vomiting be promptly noted and reported.

Psychic and Nervous Phenomena. These include many possible manifestations, such as restlessness, irritability, lack of power to concentrate, insomnia, hallucinations and delirium. These may develop early in the course of the disease and may be quite pronounced; some of these symptoms may be expected in practically all cases. Among these should also be mentioned dizziness, twitching of certain muscles or groups of muscles, and most of the other so-called eclamptic equivalents.

Coma. Convulsive seizures are usually followed by coma. This condition may also develop without convulsions in the terminal stage of most types of uremia. There is also a tendency to drowsiness and stupor which is more or less consistently present at some stage of the process and very often develops quite early.

Edema. In some cases it may be quite marked, in others entirely absent.

Eye Phenomena. These may embrace conditions ranging from a slight impairment of the vision or a sensation of flashes of light or sparks floating before the eyes, to total blindness. Various changes may be found in the eye grounds, depending upon the type of renal involvement giving rise to the uremia.

Circulatory Manifestations. This condition is, of course, more apt to develop among the high pressure types of renal disease. There is a rise of blood pressure during a convulsive seizure. The pulse may present many variations from normal, depending upon the condition of the patient.

Respiratory Symptoms. During a convulsive seizure, the respiratory system is embarrassed in proportion to the muscular involvement. The respiration otherwise may be of any of the types mentioned under kidney disease.

Auditory Disturbances. Auditory disturbances of various types are quite common.

Reflexes. The condition of the reflexes depends largely upon the type of uremia and the particular stage of the process. In the convulsive and psychic types particularly, there is a natural tendency to increased reflexes, positive Kernig and Babinski phenomena.

Laboratory Findings. These will depend entirely upon the condition causing the uremic manifestations, that is, as to whether or not the process has been of long duration and whether or not there is much renal insufficiency. Particularly in the asthenic type, there is a tendency to anemia.

The urine examination and kidney function tests should always be carefully carried out, not so much to determine the presence of uremia, as to establish the status of the renal function for the purpose of treatment and prognosis. Blood chemistry would come under this head.

Differential Diagnosis.—If the case is under observation for renal disease, there is seldom much difficulty in establishing a diagnosis of uremia when it develops. The case that presents a problem is usually the one where medical attention is first sought after advanced symptoms such as convulsion have developed. In these we may have to consider epilepsy, alcohol poisoning and many other conditions. The diagnosis here can only be worked out by careful consideration of the history and the proper evaluation of all of the available clinical evidence.

Prophylaxis.—This includes the prevention of kidney disease and its proper management when it develops. These matters have been discussed in the sections devoted to these subjects.

Treatment.—There is no specific treatment for this condition and the management is largely that of the primary kidney disease.

Uremia means that we are confronted with one of the gravest types of kidney disease. The treatment is, therefore, largely that described on page 358.

General Care.—If the patient is not already in bed and at absolute rest, this should be enforced.

The selection of treatment quarters from the standpoint of quiet, heating, lighting and convenience in nursing would be the same as for any case of advanced nephritis. There are few conditions met with in medicine that require more careful nursing, and every effort should be made to give the patient the benefit of the best possible assistance. Such matters as proper clothing, covering, bathing and intestinal elimination should receive careful attention.

Diet.—This would, of course, depend largely upon the type of uremia, the condition of the patient, and the kidney condition responsible. These matters were discussed in detail under kidney disease. See page 360.

In those patients presenting pronounced symptoms as convulsions or coma, food is hardly a consideration until the graver symptoms have been brought somewhat under control. It may be necessary to use glucose solution by rectum until mouth feeding can be instituted. In the majority of cases, the mainstay from the standpoint of nutrition is milk. The keynote of feeding seems to be a low protein, high carbohydrate type of diet. Of course those patients that progress to convalescence must have due attention given to their nutritional needs. Also the ability of the patient to handle water has to be taken into consideration. In other words as this is a manifestation of advanced kidney disease, the same dietary suggestions would apply.

Special Measures.—Many plans of management have been suggested and no one will apply in all cases. Among those measures that seem to be most frequently of value are the following:

Venesection. In the high pressure types, the removal of blood is often a life saving measure. The amount removed must depend upon the size and the condition of the patient, and his reaction. Usually from 250 to 500 cc. (one-half to one pint) is sufficient. Sometimes by the prompt use of this procedure threatened convulsions may be prevented.

In the anemic type of patient removal of blood would, of course, have to be carefully considered.

Spinal Puncture. This is not so frequently resorted to, but at times gives spectacular relief. It is not only of benefit in relieving convulsions, but often prevents or relieves such symptoms as headache and vomiting. In active psychic disturbance it may also afford much relief.

Morphine. This is one of the most consistently used agents in the effort to control convulsions. It should be given hypodermically in doses of 1/8 to 1/4 grain (0.008 to 0.015 Gm.) It is probably better to use a small dose and repeat, if indicated. It should be used with caution as it may so deepen the stage of coma as to produce disastrous results. With proper care it is one of the most valuable drugs.

Elimination. This includes elimination by the kidneys, the bowels and the skin. The value of diaphoresis is rather questionable, though in selected cases it is certainly worthy of trial. In renal elimination, as a rule, diuretics other than water should not be employed. Unless it is contra-indicated this should be given freely. If it cannot be taken by mouth, it may be given by rectum. Even if there is some water retention, the urine output may be increased sufficiently to materially facilitate the elimination of toxic substances. Elimination by bowels is certainly of advantage, but the value of violent purgation is questionable. It is probable that in many cases considerable damage is done. Hydrogogue purgatives of the saline group are most desirable.

It is often stated that calomel is contra-indicated in advanced kidney disease; on the other hand, it has been the custom of many good physicians to give this drug in cases of convulsions. A frequent practice is to use about ten grains (0.6 Gm.) of calomel and ten grains (0.6 Gm.) of phenolphthalein mixed with a little honey or syrup and put into the mouth. It will almost certainly be swallowed without inconvenience to the patient.

Other Measures. Warmth to the body and an ice bag to the head is usually a routine procedure, has no disadvantages and unquestionably is of benefit in certain cases.

There is often benefit from the administration of rather large doses of chloral hydrate and some bromide. Where this cannot be given by mouth, it should be administered by rectum. The usual dose is about fifteen grains (1 Gm.) of chloral hydrate and thirty to sixty (2 to 4 Gm.) of sodium bromide. For rectal administration it should be dissolved in about four ounces of warm water and slowly injected.

The inhalation of chloroform is at least questionable.

Where the convulsive patient has high temperature, acetylsalicylic acid may have a field of usefulness. It is given by mouth by moistening five or ten grains of the power with water, honey or syrup, and putting it in the cheek, or it may be dissolved in a small amount of whiskey or brandy diluted with warm water and administered by rectum.

There are, of course, many other measures that are employed from time to time and are of benefit, among these the use of the various vasodilators. An effort has been made rather to give in more or less detail that which has been found to be of most value.

PYELITIS

General Statement. Definition.—Pyelitis is an infection of the pelvis of the kidney. It is associated often with more extensive involvement, in which case other terms are used to designate the condition; for example, where the kidney substance is also appreciably involved in the inflammatory process, the term pyelonephritis is used; where there is an invasion of the kidney structure with a pyogenic process and the development of septic foci the term septic pyelonephritis is used.

Several types of pyelitis are recognized, for example, the primary and secondary. The primary condition is that in which the disease is apparently not the direct result of some preexistant infection in the body, as of typhoid fever. The secondary type is that in which the disease is the result of some other process, as of typhoid fever or cystitis. The disease is also sometimes named according to the infecting organism, as colon or streptococcal pyelitis.

Etiology.—The exciting cause may be any one of several organisms, the most common being the colon bacillus, gonococcus, streptococcus, and staphylococcus. The contributing causes are many and varied; among which are the following:

Foci of Infection. Any infectious process located in the body may result in pyelitis. The most common are tonsillitis, abscessed teeth, prostatitis and, directly or indirectly, urethritis.

Renal calculi are decidedly predisposing causes, not only to pyelitis, but to that type which is most resistant to treatment and lends itself to discouraging changes.

Sex. It is much more common in young females, particularly in children. This is largely due to well known anatomic conditions predisposing to urethritis, cystitis and later pyelitis.

Marriage is now well recognized as the cause of non-specific cystitis and, indirectly, of pyelitis. It is a very common and sometimes a serious error for the profession to regard all cystitis and pyelitis in married women as being specific in character.

Pregnancy favors the development of pyelitis, due principally to pressure resulting from the presence of the gravid uterus; and when this condition develops there is a tendency for it to persist until after delivery. Sometimes the chronicity seems to be so established that a resistant process is continued beyond the period of gestation.

Mode of Infection. Several avenues of approach to the kidneys are recognized; of these, two are distinctly common, the others are rather rare. The first of these is the urinary tract. Here the infectious process passes up the ureter gaining access to the kidney pelvis. This is the course that is responsible for the vast majority of cases in infant girls; the colon baccillus (usually through a "napkin infection") gains entrance to the urethra, then proceeds upward.

The next most common route is through the blood; this accounts for that large group of cases that are the result of tonsillitis, otitis media and other foci of infection.

Other modes of infection are possible, such as the direct extension of a related inflammatory process and the passage of the organisms through the bowel wall. These are distinctly of secondary importance as compared with the former two, mentioned in the preceding paragraphs.

Incidence.—The disease is particularly common; in fact, it is only too true that routine examination of the urine reveals that very often diseases diagnosed and treated, *e. g.*, as malaria or typhoid, are in reality pyelitis. In other words, a physician doing systematic, routine laboratory work has more pyelitis in his practice, or at least recognizes more.

As previously stated, the condition is more common among females, particularly infants. It is also fairly frequent in old age, especially in women. Not only is the child more subject to "napkin infection," but for anatomical reasons, women are more exposed to infection from bathtubs, linen, and various other sources.

Course and Prognosis.—There are few diseases presenting a more variable course, both as to severity and duration. This is influenced largely by the type of infective organism, by the promptness of diagnosis and treatment, and by various other factors, particularly age. In young children it is more apt to be a stormy, febrile process, although in adults it is not unusual to see cases characterized by high temperature and rapid prostration. The statement has been made that the average duration is about that of typhoid fever, but this is probably too severe an indictment. It would seem to be more correct to reduce this by about one-half from the standpoint of disability, though it is usually several weeks before the urine is entirely free from pus. As previously stated, in cases of pregnant women, there is a strong tendency for the condition to persist until after delivery. The cases with renal calculi are very resistant to treatment. The causes of death are usually toxemia, exhaustion or complications, the most common of which is an extension of the involvement to include the kidney substance. A fatal termination is rather rare.

Symptoms and Diagnosis.—The fundamental requirement for the diagnosis of this condition is always to suspect its presence. Urinalysis should be a routine part of all examinations. Even where there is some other definite disease present, renal disturbance may be a complicating factor.

Another fundamental consideration is to recognize the fact that the disease is rather protean in its manifestations and often a fairly serious condition may be present without showing characteristic symptoms that would particularly call attention to this type of kidney involvement.

History. The points that are of particular interest in the diagnosis are the history of previous attacks of pyelitis (as there is a tendency to recurrences), and a recent dysuria from any cause. The history of recent catheterization is of importance, and, unfortunately, this is especially true if the catheterization has been done by nurses. Of importance also is the recent presence of such infectious processes as tonsillitis or otitis.

Onset. There is usually a period of indisposition with malaise, loss of appetite, and general discomfort. In many cases, however, the attack begins suddenly without any premonition of ill health.

Fever. The temperature varies through a wide range, not only in different cases, but often in the same patient. One patient may pass urine loaded with pus and show very little fever; another patient with less involvement may show temperature of 104 or 105. In addition to this there is a tendency to remissions and intermissions in the temperature, sometimes several exacerbations occurring in the course of twenty-four hours. These rapid changes in temperature are due largely to interference with drainage: the ureter becomes blocked with pus or mucus and there is an accumulation in the kidney. This causes a rapid rise in temperature, which subsides when the obstruction is finally forced through. Fever may persist for many weeks, but in the majority of cases it subsides within ten or fifteen days.

Chills. The symptoms may be ushered in by a chill of more or less severity. It is probable that many of these cases were formerly diagnosed as malaria. There may be repeated chills for many days; these are probably due to the stoppage of drainage through the ureter. The point of diagnostic importance here is the irregularity of the chills in point of time. They may be very infrequent or repeated at short intervals, sometimes five or six occurring in twenty-four hours. In children a convulsion may be precipitated instead of a chill. In many cases there are only periods of chilliness and no definite paroxysms.

Sweating. Periods of sweating follow the chills very much as in malaria; or where the condition persists, there may be a tendency to excessive perspiration similar to that found in tuberculosis.

Pulse. The pulse is not characteristic. It usually follows the temperature curve as is the case in most febrile conditions.

Respiration. The respiration is not affected more than in other febrile conditions except in those cases where there is local pain and tenderness, resulting in discomfort on deep respiratory movements. This causes the short shallow type of respiration with a natural increase in rate.

Nausea. There seems to be a rather distinct predisposition to nausea in this condition. Very often vomiting will accompany the periods of exacerbation occurring with the chill and rise in temperature.

Dysuria. Pyelitis is so frequently associated with cystitis that painful urination might be classed as one of the symptoms of the former.

Pain. There is usually headache, as in other febrile diseases; the same is true of general body pains. In addition to this, a symptom of major importance is pain in the kidney region. This may be entirely absent even in cases of much severity; on the other hand, it is often very pronounced. The pain is usually described as radiating downward toward the pelvis, and in males, sometimes into the testicle on the side involved; this point is of particular diagnostic importance in differentiating between kidney and gall bladder diseases.

Tenderness. This is one of the most valuable diagnostic indicacations. While being examined the patient should lie flat upon his back and relax the abdomen as much as possible. The investigator places one hand under the kidney region and the other just below the costal margin, making firm pressure as the patient forcibly exhales.

Laboratory. The blood usually shows an increase both in the total white corpuscles, and in the neutrophile percentage, just as with other pyogenic processes. In protracted cases there is the usual tendency to anemia.

The kidneys should be investigated both by the common urinalytic and by the various renal function tests. In women, if the voided specimen shows pus, a catheterized specimen should always be examined before a definite statement of pyuria is made. One negative report is not final for the reason that, due to the stopping of a ureter, there may be periods during which the pus may not appear in the urine. Under all circumstances the urine should be centrifugalized for microscopic examination. The amount of albumin as compared to the amount of pus should be carefully estimated, as there is a higher ratio in pyelitis than in cystitis. The urine should also be investigated for the causative organisms, and in the cases that do not promptly clear up under the usual plan of treatment, search for the bacilli of tuberculosis should be made not only by the examination of stained slides, but also by guinea pig injections. As there is a decided tendency toward involvement of the kidney substance, persistent cases should always have the benefit of phenolsulphonephthalein and two-hourly function tests.

Cystoscopic examination with catheterization of the ureters is often of great value in diagnosis, as well as in treatment.

X-ray. This manner of investigation is rather neglected. Chronic cases especially should have the benefit of an x-ray examination, not only to determine the size and position of the kidney, but also to detect the presence of calculi.

Differential Diagnosis.—The two principal considerations here are; first, whether or not pyelitis is present, distinct from other diseases; second, whether or not other disease conditions are present in addition to pyelitis. From cystitis it is differentiated largely by the tenderness being in the kidney region in the former and in the bladder region in the latter. The same applies to pain when present. In pyelitis there is a greater tendency to the presence of albumin, or rather to a higher percentage of albumin. Kidney abscess or such conditions as pyelonephritis are differentiated largely by the presence or absence of casts, by the x-ray findings, and by the course of the disease.

Diaphragmatic pleurisy and subdiaphragmatic abscess may be rather difficult from a diagnostic standpoint; in these we have the history of the disease, the presence of cough, the greater tendency to painful respiration and the difference in the urinary findings.

Tuberculosis of the kidney may be suggested by the presence of tuberculosis elsewhere in the body and diagnosed by the results of urinary investigation.

Prophylaxis.—The principal work that can be done in the way of prevention is prompt attention to those conditions that are known to be contributing factors to the development of the disease, such as tonsillitis, urethritis and cystitis. Another measure of importance is the treatment of certain diseases, such as typhoid fever, along the lines of kidney protection; for example, the routine use of hexamethylenamine in the later stages of typhoid probably has a decided effect in lessening the incidence to pyelitis.

Treatment.—In the treatment of this condition, as in many others in medicine, there must be a division of effort between relief and cure, with due attention to preventing complications. There is no outstanding line of treatment that has met the unqualified endorsement of the medical profession. Pyelitis also, is a condition in which much can be done by the general management of the case, independent of medication.

General Care.—In the febrile cases absolute rest in bed is certainly indicated. After the stormy febrile period has passed and the pain and tenderness subsided, it is possibly an advantage to get these patients up, and into a modified activity; at least this is the contention of a large part of the profession and is based on the supposition that drainage of the diseased kidney pelvis is facilitated. It is best to be guided by the clinical condition of the patient in this disease as in others.

During the febrile period the patient should be in a comfortable bed in a well ventilated room, properly heated in cold weather. The requirements here are the same as they would be in other febrile diseases of similar degree. We also have to take into consideration the possibility of involvement of the kidney substance and be guided accordingly in the matter of exposure. The clothing should be comfortably warm; chilling of the surface of the body must be avoided. In those cases in which there are alternate periods of high temperature and comparative comfort, it is better to meet the changing requirements by adjusting the covering instead of the clothing. The patient should be given a warm bath daily, care being exercised to avoid chilling. It is seldom necessary to resort to hydrotherapy to reduce temperature; if such should be the case, warm sponge baths are preferable.

These patients should be given large amounts of water, either plain or in the form of various beverages, such as diluted fruit juices. The idea is not only to favor general elimination and dilution of toxins, but to flush out the urinary tract. Where water is well handled, the patient may take from five to ten pints in twenty-four hours. The bowels should be kept sufficiently active, care being exercised to avoid the use of hydragogue agents, as these act by the elimination of fluid through the bowels instead of through the kidneys. An ice bag to the head may be indicated by fever or headache.

Diet.—During the stormy period, particularly if there is very high temperature, one must be guided by the digestive ability and the nutritional needs of the patient, and at the same time consider the kidney condition, avoiding all irritants and unnecessary burden on the renal function. During the febrile period the patient may have a diet such as water, diluted fruit juices, malted milk, butter milk, simple soups, and cereal broths. These should be made without meat, the cereals thoroughly cooked, the soup strained, and some milk or cream added. After the temperature has sufficiently subsided, milk may be added to the diet, later followed by toast, well cooked cereals, and other simple articles of easily digested food. Alcoholic or malt beverages should not be used; tea and coffee, if used, should be given sparingly; spices and highly seasoned food should be absolutely prohibited. Even after convalescence has been definitely established and a fairly liberal diet is being taken, renal irritants should be excluded from the diet. As the period of discomfort and high temperature is usually short in this disease, there is little necessity for a high caloric intake until the patient's condition is more favorable for proper digestion and assimilation.

General Medication.—Many agents have been suggested and tried out in the past and some of these have stood the test of clinical experience. There is no one plan that seems to be outstanding in its value.

Among the various drugs employed are the citrates. By many physicians these are considered almost specific. Another plan is to alternate periods of the citrate treatment with periods of other medication. The citrates when used are given in large doses. The following prescription will illustrate the general method of prescribing them in private practice:

		or
Sodii Citratis,	℥j	30|0
Liq. Potas. Citratis,	q.s. f℥vi	180|0
M.		

Sig.—Tablespoonful well diluted, every three hours.

This may be given in water or carbonated water, but probably the best plan is to give it in lemonade.

Methenamine (Hexamethylenamine). This is often used under the old proprietary name of urotropin; as it is now one of the official drugs of the pharmacopeia, it would seem advisable to prescribe it under its proper title. There are several conditions that must be borne in mind in the use of this drug. One is that it is a chemical combination of ammonia and formaldehyde and it acts only when split up into its constituent radicals. This takes place in an acid medium; therefore, when giving this agent, it is necessary to keep the urine acid and to avoid the administration of alkalies. This excludes the use of certain fruit juices, especially lemonade, the ultimate products of which are alkaline. Another consideration is the frequent idiosyncrasy this drug unmasks, sometimes without any demonstrable cause. Often a patient can take it comfortably for one, two or three days, and after that develop much discomfort. The most common unfavorable developments are dysuria and hematuria. I treated another physician who gave the history that he could take the drug three days without discomfort and would then develop both dysuria and hematuria. I tried this out twice in his case and in both instances the trouble developed at about the end of the third day. Some patients seem able to take a reasonable amount for almost any length of time. When discomfort develops, the drug should be promptly withdrawn and large doses of citrates administered; the relief is usually prompt and complete. The average dose is about 7½ grains (0.5 Gm.). Many use it in 10 or 15 grain (0.6 or 1 Gm.) doses repeated every two or three hours until the desired effect is obtained or unfavorable symptoms develop. The tablets are often prescribed; they dissolve very slowly and have a tendency to lose weight through the gradual splitting up of the drug into its constituent radicals. This takes place more rapidly when the drug is prescribed in powders. When a drug clerk I once filled a prescription for a man who was going on an extended voyage; the order called for enough powders to last him on the trip. He came back highly indignant at finding that after a time the papers contained only a small amount of the drug, and towards the close of the voyage many of them were found to be entirely empty. Probably the most satisfactory way to prescribe this preparation is as follows:

		or	
Methenaminæ,	ʒiv	15	0
Aquæ,	q.s. f℥iv	120	00

M.
Sig.—Teaspoonful in water every three hours.

If necessary the urine may be kept acid in reaction by giving with this sufficient amounts of acid sodium phosphate.

Hexylresorcinol is coming into use as a new urinary disinfectant and it seems to be of considerable value. It is usually administered in prepared capsules of about 2 grains (0.15 Gm.). The average total daily dosage is 27 grains (1.8 Gm.). The price of the preparation is rather high and this at times may have to be a consideration in deciding whether or not to try it.

Salicylates. During the period of acute symptoms, when the temperature is high and there is much discomfort, the following prescription is often of advantage, and in many cases seems to meet all requirements of treatment.

		or	
Acidi Acetylsalicylici,	gr. c	6	5
Phenylis Salicylatis,	gr. cl	10	0
Acidi Borici,	gr. cc	13	0

M. ft. cht. no. xx
Sig.—One every four hours till relieved.

As improvement takes place the dose is reduced to ½ powder or the intervals lengthened. This may also be used in conjunction with hexamethylenamine.

Another plan of treatment that is often employed is that based on the frequent changes in the reaction of the urine. In some cases the infecting organism seems to be facultative to the extent of being able to adapt itself to either an acid or an alkaline urine, but the change from one to the other has a tendency to impair its development. This may be accomplished by using large doses of citrates or some other alkali for three or four days, then changing to such agents as sodium benzoate or acid sodium phosphate; to restore the acid reaction and raise it as high as possible for three or four days, after which the citrates are again employed. During the days of acid treatment hexamethylenamine may be given also.

For increasing the acidity of the urine, acid sodium phosphate is one of the most satisfactory agents. The only disadvantage is that its laxative action is sometimes so decided as to prevent its being employed in sufficient amounts.

Symptomatic Treatment. Dysuria. It should be remembered here that cystitis and urethritis are often associated with pyelitis. Dysuria is often relieved by the intake of large amounts of liquid. Hot or cold applications are of value. Sometimes irrigation of the bladder with warm boric acid solution or some similar preparation may be of advantage. In the majority of cases the acetylsalicylic acid prescription given in a preceding paragraph tends to give relief for this discomfort. Where the dysuria is the result of medication with hexamethylenamine, the citrates will promptly relieve. The following prescription has been recommended by Cully:

℞		or
Sodii Citratis,	ʒiv	15,0
Tinct. Hyoscyami,	fʒiv	15,0
Aquæ,	q.s. f℥iij	90,0

M.

Sig.—One or two teaspoonfuls in water three times a day when needed.

Fever. The requirements here are usually met by rest, fresh air, the intake of large amounts of water, an ice bag to the head, and proper bathing. There is no objection at this stage of the disease to the use of acetylsalicylic acid as previously outlined.

Nausea. This can usually be relieved by rest, quiet and proper attention to diet. The subsidence will be coincident with the general improvement in the condition of the patient. Sometimes small drinks of carbonated beverages are of benefit. In the way of medication fairly large doses of some bromide will come nearest to meeting the requirements.

Ureteral Catheterization and Treatment. This measure is carried out rather easily in women, but is much more difficult and painful in men. There is a certain percentage of cases that do not respond to any other type of treatment, and this measure has been the means of relieving many that otherwise would have grown progressively worse. It is my opinion, however, that the simpler plans of treatment as previously outlined should first be given a fair trial, unless there is some reason to suspect complications that might require immediate action. This measure should be attempted only by one especially trained in the necessary technic.

Vaccines. These have proved rather discouraging in pyelitis. In the chronic cases it is always worthy of trial. In my own experience the stock vaccines have not been of any apparent benefit, with the possible exception of those cases that develop from a specific urethritis. Autogenous vaccines probably offer a greater percentage of benefit.

Surgery.—This is at times a necessary and life-saving measure, particularly in those cases where there are renal calculi or pyonephrosis. Removal of the kidney, of course, should be resorted to only after a very thorough investigation of all available data has established the fact that one kidney is a menace to the well-being of the patient, and that the other is sufficiently normal to meet the entire demands that will be thrown upon it.

Convalescence.—There is no particular difference between the management of the convalescence here and in other protracted diseases. The physician should bear in mind the tendency to recurrences and in releasing the patient should arrange for repeated investigations at regular intervals. It is also advisable to exclude from the diet and medication all possible renal irritants. If the patient has lost weight the diet should be built up rapidly in order to establish a return to normal. If there is anemia iron may be used in conjunction with other medication. Probably the most satisfactory preparation is the official Solution of Iron and Ammonium Acetate (Basham's Mixture). It is usually given in tablespoonful doses between meals.

Complications.—The complications such as abscesses, pyelonephritis and pyonephrosis, will be considered under separate heads.

PYELONEPHRITIS

General Statement.—Pyelonephritis is one of those conditions that could properly be considered as a complication of pyelitis or even of nephritis, but for some reasons it usually has been thought best to discuss it independently.

Definition.—It is a condition that results from a combination of a purulent infection of the kidney pelvis and a nephritic type of involvement of the kidney substance. It must be differentiated from suppurative pyelonephritis which will be discussed under a separate head.

Etiology.—It is certainly probable that there are no cases of pyelitis without some extension inward of the process, hence it is rather difficult to draw a distinct line between this condition and pyelonephritis.

The mode of infection may be the same. The involvement of the kidney substance, which characterizes this disease, may be direct or indirect, and is very often both.

Course and Prognosis.—The course of this disease is naturally more variable than that of pyelitis. It is more serious for reasons that can be well understood, and very often when the pyogenic process has subsided and the urine is free from pus, the nephritis still persists. It can readily be understood, therefore, that the prognosis is much more grave.

Symptoms and Diagnosis.—All of the symptoms of pyelitis are, naturally, present. The main difficulty in making a diagnosis is in determining the fact that there is more extensive involvement.

Differential Symptoms. Among the symptoms of diagnostic value might be mentioned the following: There is a greater tendency for the condition to persist: the headache, nausea, and other discomforts are apt to be more accentuated than in simple pyelitis, and these may persist, more or less unabated, even after the pus has disappeared from the urine and the temperature is subsiding. There is the tendency to edema and changes in blood pressure. In other words, there is a combination of the well known symptoms of pyelitis and of nephritis.

Laboratory. There is a greater number of casts present than in pyelitis; when there is much pus it may be difficult to recognize their presence, but a careful search will usually be rewarded. There is a greater percentage of albumin than would be expected from a simple pyelitis and also a greater tendency to impairment of renal function, as will be revealed by the P.S.T. or the two hour function test.

Treatment.—The measures of general care, such as rest, quiet, proper clothing and covering, are of much more importance than in simple pyelitis. In this disease we must, to a large extent, combine the suggestions offered for pyelitis and nephritis, being guided, of course, by the condition of each individual patient.

Diet.—The diet is that for acute nephritis. (See page 360.)

Medication.—It is advisable to abstain from the use of such drugs as the salicylates, and, under most circumstances, from hexamethylenamine. The citrates probably offer the best available form of medication and may be employed as discussed under pyelitis. The symptomatic treatment of nausea, headache, dysuria, etc., is the same as in the related conditions of nephritis and pyelitis.

SUPPURATIVE PYELONEPHRITIS

General Statement. Definition.—This is a condition in which there is an invasion of the kidney substance by a pyogenic process, resulting in a greater or lesser number of small foci. Where one of these becomes sufficiently large, it is called a kidney abscess, which, being a distinctly surgical condition, will not be discussed here.

Etiology.—This disease is closely related to pyelonephritis, and may result from it or directly from some local or general infection such as endocarditis or septicemia. It is fraught with such serious possibilities that its early recognition is of much importance.

Course and Prognosis.—It usually runs a variable course, and may result in any of the following:

Cure with more or less complete return of the organ to normal activity.

Impairment of the functional integrity of the kidney with resultant uremia.

Formation of large abscesses; these may reach the surface resulting in paranephritic, or subdiaphragmatic abscesses.

Death due to toxemia or exhaustion.

Symptoms and Diagnosis.—This is one of these conditions where there are many difficulties in the way of establishing its presence. The predominating evidences are those of pyelitis or pyelonephritis as previously discussed. (See page 390.)

Differential Diagnosis.—In differentiating this disease from simple pyelitis the following points may be remembered: There is a great tendency for a typhoidal course, both in temperature and duration; there is usually more pain and tenderness in the kidney region; there is a greater tendency to the involvement of the surrounding structures through continuity; there is a greater interference with the kidney function, as shown by the usual tests. The *x*-ray is sometimes of benefit in establishing a diagnosis.

Treatment.—There is no definite line of treatment that can be prescribed for this condition with hope of spectacular relief. It might be said in a general way that the treatment is essentially that of pyelonephritis.

General Care.—When this condition is recognized, preparations must be made for a protracted siege, and such matters as the selection of treatment quarters, absolute rest, and proper nursing must be arranged for on this basis.

Diet.—In the matter of diet great care will have to be exercised so as to keep up the state of nutrition. In the case of pyelitis, we are dealing with a short stormy process; here it is one in which the general resistance is to be a most important factor, and heavy demands will be made upon it. The patient should be given large amounts of fluids, just as suggested under the treatment of pyelonephritis. There must be the same freedom from renal irritants. The same type of food would apply here, but there is the necessity of greater respect for adequacy of nutrition.

Medication.—Medication is the same as in pyelonephritis. (See page 390.) Autogenous vaccines theoretically should be of value; so far the results have been rather discouraging, but they are certainly worthy of continued trial.

Surgery.—Surgery is at times the deciding factor in securing relief. In all cases proper check should be kept on the renal function and surgical complications looked for, that the patient may be given the benefit of an early consultation.

PYONEPHROSIS

General Statement. Definition.—This is a condition where there is an accumulation of purulent material in the kidney pelvis resulting from a pyogenic infection and the drainage being prevented by occlusion of the ureter. Sometimes this accumulation may be quite large in amount. The blocking of the ureter may be due to inflammatory thickening of the mucous membrane or to the lodgment of a calculus or a plug of pus or thick mucous.

Incidence.—The condition is rather rare. It is most often found past middle life and is much more common in women.

Etiology.—This disease usually occurs in the course of a pyelitis or a suppurative pyelonephritis. It is, therefore, more of a complication of one of these conditions than a separate entity.

Symptoms and Diagnosis.—There is usually a history of pyelitis or suppurative pyelonephritis. With the stoppage of the ureter, there is accentuation of the symptoms. There is usually a chill, a marked elevation of temperature, and an increase in the local pain and tenderness. The patient seems and is quite ill. Sooner or later there can be detected a mass in the kidney region. It is not uncommon for these cases to have repeated interferences with drainage, usually by a plug of material which is gradually forced through as pressure is increased back of it. Each time there may be a chill or rigor and an accentuation of temperature and discomfort. As drainage is re-established, there is an improvement in all symptoms. This may be repeated with more or less frequency until finally the disease process subsides or drainage is permanently blocked and surgery has to be resorted to.

A diagnostic point of importance is the change in the laboratory findings. Where the infectious process is unilateral and is confined to the kidney, that is no bladder or urethral infection, pus more or less entirely disappears from the urine. Should drainage be re-established, there is promptly a large increase in the pyuria.

Treatment.—The treatment may be divided under two heads. The first of these is medication which is essentially that of pyelitis and pyelonephritis. This should be maintained unless it be established that there is permanent obstruction of the kidney outlet. Where this is due to torsion, relief may sometimes be obtained by manipulation. When the obstruction remains, surgical interference is indicated.

CYSTITIS

General Statement. Definition.—Cystitis is an inflammatory condition of the urinary bladder. Many varieties are recognized. One classification is into primary and secondary, the former including cases in which the disease originated in the bladder; the secondary cases are those in which the morbid process originated elsewhere in the body and the bladder infection is a complication. For example, a primary pyelitis or urethritis is very apt to develop a secondary cystitis.

Another grouping is into acute and chronic. The chronic cystitis is usually a later stage of an acute process. The disease is also classified according to the invading organism, as gonorrheal, colon, tuberculous, etc.

Incidence.—While cystitis may be found among all classes and conditions of people there are certain groups that present the vast majority of cases seen in practice. It is more common among females. This is probably due to anatomical conditions that render the urinary tract of women more susceptible to the invasion of micro-organisms. It is also more common in women and girls due to the frequency with which it develops as a result of vaginitis. Marriage and pregnancy also play a part in fixing the percentage of this group. In children the condition is rare among boys and very common among girls, particularly infants. This is usually due to an invasion of the colon bacillus from a napkin infection. There is a marked tendency for a nonspecific, as well as a specific urethritis to develop in women in the early months of married life and considering such cases as always gonorrheal is a serious mistake that is often made by medical men. There is a decided tendency to the development of cystitis during pregnancy, and for it to be rather resistant to treatment until after labor.

Etiology.—The exciting cause may be any one of a large number of organisms. Of these the colon bacillus and the gonococcus are the most common. Irritants taken by mouth or injected may damage the mucosa to the extent of lowering the resistance and favoring the development of the inflammatory process. Organisms may gain entrance in any one of several ways. There may be an ascending infection from the urethra or a descending infection from the kidneys or involvement by direct extension of an infectious process in the bladder region. There are several predisposing factors in such conditions, as age, sex, marriage, pregnancy, and necessity of catheterization. These have been discussed under incidence.

Course and Prognosis.—The acute process runs an average course of from one to three weeks. Under favorable conditions the discomfort subsides in a few hours or a few days at most. The principal trouble is from the marked tendency to recurrent attacks or for the condition to become chronic. The outlook in chronic cystitis is rather discouraging, at least for an early cure. Another possibility if importance is the complication of pyelitis. Under all circumstances the prognosis as to life is excellent, fatal terminations being extremely rare.

Symptoms and Diagnosis.—Many of the symptoms as described under pyelitis will apply here. In fact, the two conditions are so intimately associated as to make it advisable to carry the relation always in mind.

History. Of considerable importance in establishing a diagnosis is a history of a known contributing cause, as urethritis, pyelitis, recent marriage (in females), or recent catheterization. The history of previous attacks is also of importance.

Onset. This may be gradual with general discomfort and malaise, but is more apt to be rather sudden, beginning with dysuria followed by fever, headache, and other evidences of an acute febrile process. Very often the attack is ushered in with a rigor or even a distinct chill.

Pain. Dysuria will be discussed later. During the acute stage there is usually headache and general pains, the latter being referred particularly to the lower back. The patient will often complain of an intense burning pain in the perineum and rectum. There is almost always considerable tenderness over the bladder, particularly upon deep pressure, accentuated by coughing or sometimes even by normal respiratory movements.

Temperature, Pulse and Respiration. Many cases are almost without febrile reaction. In chronic cases there is very little, if any, elevation of temperature. Acute cystitis usually shows a period of rather high fever, sometimes reaching 104° or 105° F. There is a proportionate increase in the pulse and respiratory rate. At times the respiration may be increased beyond the usual ratio by limitation of diaphragmatic movements due to rigidity of the abdominal muscles, and at times because the full respiratory movement causes discomfort in the sensitive bladder region.

Gastro-intestinal Symptoms. During the acute attack there is often nausea and vomiting. Anorexia is fairly complete; though there may be thirst, there is no desire for food. In the chronic condition there is little, if any, gastor-intestinal disturbance.

Dysuria. This is the characteristic symptom of the disease. There is a frequent desire to empty the bladder, sometimes an almost constant one. This condition may result, to a certain extent, from the large water intake. The process of voiding usually causes much pain, generally of an intense burning character. This is often referred to the perineum, or to the glans in the male. Tenesmus is one of the most disturbing manifestations of the disease.

Laboratory Examination. The blood usually shows increased total white and neutrophile counts, as would be expected from an inflammatory process.

The urinary findings constitute the most definite evidence of the disease. The urine may be turbid or practically clear, depending principally upon the amount of pus, some of which is always present. At times it may have almost the appearance of milk. The odor is usually ammoniacal and in certain types of the disease is very offensive. If the ammoniacal odor is not present when the specimen is first voided, it later develops as chemical changes take place. The reaction is usually alkaline or becomes so soon after the specimen is passed. Blood may or may not be present. There is usually albumin though seldom in considerable amounts.

Cystoscopy. This is the most valuable aid in the diagnosis of this disease. Not only does this investigation establish or confirm a diagnosis, but it will give much information as to the character and extent of the inflammation. At the same time valuable information may be obtained as to the presence or absence of pyelitis.

Differential Diagnosis.—In the case of children, particularly girl infants, cystitis should always be considered as a possibility in the presence of fever, especially if associated with marked discomfort. The main conditions from which it must be differentiated are urethritis, pyelitis, and in the male prostatitis, and in the female inflammation of the genital structures. It must be remembered that in the case of women a diagnosis of pyuria should not be definitely made without examining a catheterized specimen but if the voided specimen does not contain pus cells a catheterized specimen naturally is not needed to exclude infection of the bladder. In the differential diagnosis the cystoscope is at times indispensible. Much other evidence may be obtained as from the location of the pain and tenderness and the history of the case. In the case of males one of the oldest and simplest tests and one that may be carried out by any physician under almost any circumstances and yet is often neglected, is the three glass test. This is to determine the origin of pus in the urine and may be made as follows:

The patient is required to retain the urine for as long a time as is reasonably convenient. He then voids about one-third of the bladder contents into glass No. 1; about one-third into glass No. 2; the prostate is then massaged, and the last of the urine is passed into glass No. 3. If the first glass shows pus it may come from anywhere in the urinary tract, including the prostate. If the first glass shows pus and the second glass does not, this indicates that the pus was not in the bladder but was in the urethra and was washed out with the first specimen so the second, which represents the bladder content, was free. The diagnosis, therefore, would rest between a urethritis and a prostatitis. If glass No. 1 contains pus and glasses No. 2 and 3 do not, the evidence is conclusively in favor of urethritis, but if glass No. 2 does not contain pus and glass No. 3 does contain it the evidence is fairly conclusive of a prostatitis. If all of the specimens contain pus it indicates that the inflammation is in the bladder or kidneys.

Another point of importance in establishing a differential diagnosis is that in pyelitis there is a marked tendency to casts and to a larger percentage of albumin than in simple cystitis.

Treatment.—This is one of the conditions in which treatment offers much, not only in the way of cure, but in symptomatic relief. The earlier the treatment is instituted the more prompt the relief and the less the tendency to complications or to a chronic course. Naturally one of the most important factors is the removal of any cause that might be present, such as vesical calculi, pyelitis, urethritis, or prostatitis.

General Care.—During the stage of acute symptoms, of fever or pain, the patient should certainly be confined to bed. He should be made as comfortable as possible and as free from noise, excitement, or worry, just as in all febrile diseases. This is probably of more importance with cystitis because the condition is characterized by so much discomfort.

Nursing. The patient requires considerable attention during the acute stage, due largely to the amount of discomfort that the disease entails. Also where local measures of treatment are carried out, expert nursing is indispensable. After the subsidence of the symptoms, such as fever and discomfort, there is no reason why these patients should not be allowed to get up and resume modified activity. In fact it is claimed by many that the drainage of the bladder is more complete than when they are confined to bed; this is after the period of intensive treatment and if no complications arise. During the period of confinement, the patient should be given the benefit of warm baths, an ice bag to the head when the temperature is high, and other measures that contribute to comfort.

Bowels. The bowels should be kept comfortably active but violent purgatives avoided. If laxatives are needed at all, such mild agents as liquid petrolatum or milk of magnesia should be used. Constipation is particularly undesirable and enemas may be employed as needed to prevent an accumulation in the lower part of the intestinal tract. Hydragogue purgatives act unfavorably by eliminating water through the bowels and thus concentrating the urine.

Water. Large amounts of liquid are necessary. It has been contended by some that it increases the frequency of urination and thus contributes to discomfort. The benefit, however, of this method of irrigating the diseased area and of diluting the urine certainly more than balances any objection. Water should be given as such; when there is not much fever, milk and other bland drinks may be given. Fruit juices, particularly lemonades, should not be used when an effort is being made to keep the urine acid.

Diet.—In the matter of diet we have several factors to consider, in addition to the digestive ability of the patient, which must always be borne in mind in arranging a diet for the sick. Among these are the necessity for a large fluid intake, and the necessity for avoiding any urinary irritants. It must be remembered that the acute stage is usually of short duration; therefore, during the early stage of the disease, there is no necessity for forcing a high caloric intake. Another consideration is the fact that the plan of treatment often depends on a certain reaction of the urine.

During the period of fever such articles may be given as water, cereal broths, malted milk and similar preparations, butter milk, and sweet milk diluted with barley water. After the fever subsides, whole milk should be added and should continue to constitute a large part of the diet; to this may be added soft cereals (as rice, grits, cream of wheat, and corn meal mush), toast, butter, and such other bland articles of food as the condition of the patient will allow. Where the effort is being made to keep the urine acid, most fruit juices must be omitted as previously suggested.

General Medication.—Many drugs have been recommended for administration by mouth. It is not necessary to attempt to discuss all of these, but only the ones of proven value.

Salicylates. During the acute stage of pain and high temperature the salicylates seem to meet the requirements better than anything else, not only for their pain-relieving qualities, but for the reason that they contribute towards keeping the urine acid and probably have some bactericidal value. The following prescription may be used:

℞		or	
Acidi Acetylsalicyl.,	gr. c	6	6
Phenylis Salicylatis,	gr. cxx	8	0
Acidi Borici,	gr. cl	10	0

M. ft. cht. no. xv
Sig.—One every four hours till relieved.

This is given every four hours until the patient is more comfortable, when the intervals are lengthened or the size of the dose reduced; usually it is best to lengthen the intervals between the doses. In many cases this is the only internal medication that it is necessary to employ. If pyuria persists after the clinical symptoms have subsided, it may be advisable to use some other type of medication. Of course this prescription is variable with the size, age, and condition of the patient.

Methenamine (Hexamethylenamine). The advantages and disadvantages of this drug were discussed under Pyelitis, (page 386).

One of the main objections is the rather marked tendency in certain cases to increase the dysuria and sometimes to produce hematuria. The patient or attendant should always be cautioned as to the possibility of these reactions developing and be instructed as to what to do to meet the emergency. Relief is obtained by discontinuing the drug and giving large doses of the citrates. One of the considerations of importance in using methenamine is to keep the urine acid; this may be accomplished by the use of acid sodium phosphate, sodium benzoate, or other drugs known to give this desired effect.

Citrates. The citrates are largely used, particularly where there is a tendency for the disease to become chronic. Citrates have been extensively recommended in the treatment of pyelitis, but much less so in the treatment of cystitis. It seems to some that this difference is hardly justifiable. Very often the citrates may be alternated to advantage with methenamine and the acid treatment; that is, giving the citrates for three or four days in sufficient amounts to make the urine alkaline, then changing for a few days to methenamine and some agent, to render the urine acid.

Belladonna and Hyoscyamus. These seem to have considerable effect in relieving the discomfort and are often associated with other drugs as in the following prescription:

℞		or	
Sodii Bromidi,	ʒij	8	0
Potas. Citratis,	℥j	30	0
Tinct. Belladon.,	fʒj	4	0
Liq. Potas. Citratis,	q.s. f℥vj	180	0
M.			

Sig.—Tablespoonful in water every three hours till relieved.

Local Measures.—Hot applications to the lower abdomen often give considerable relief. Cold applications in certain cases will be of benefit. Sitting in a tub of hot water has given temporary relief.

Bladder irrigation constitutes a valuable type of treatment. During the acute inflammatory stage, especially if there is a urethritis, it may give so much discomfort as to be unavailable for use. Among the agents that are employed are warm sterile water, warm boric acid solution (1 to 2 per cent), potassium permanganate solution (1:5000 to 1:10000), or silver nitrate solution (0.2 per cent). Many other agents, of course, have been suggested. In the case of males this irrigation should be done without a catheter if possible, but if a cathether is used it should be with extreme caution, with regard both to asepsis and to the avoidance of trauma. In the case of females it is better to use a glass catheter with rubber connection. There is a tendency to neglect asepsis in the catheterization of females, but it should be carried out with just as much care as any other surgical measure. The bladder should not be extremely distended in the acute disease; in the chronic types, it is often advisable to distend it as much as the patient can tolerate. If a catheter is used the procedure is to allow a sufficient amount of fluid to flow in, then, with the catheter still in place, disconnect and allow the bladder to empty. The process is repeated until the washings are clear.

Installations. In preparing to use an installation the urine should be voided or drawn, the bladder properly irrigated with plain sterile water, then the medicine injected. Where a catheter is used the medicine should be injected through the catheter that is used for irrigating the bladder. The medicine may be left in the bladder or withdrawn after a proper interval, depending on what is used. The solutions usually employed are mercurochrome in about one per cent, argyrol in 5 to 10 per cent and silver nitrate in about 0.2 per cent strengths.

Symptomatic Treatment.—In carrying out the treatment just outlined the symptomatic requirements are usually met.

Dysuria. Rest, local applications, large water intake, and particularly the use of salicylates, as recommended in a preceding paragraph, meet the requirements in most cases. Codeine may be used either by mouth or hypodermically if needed. At times the administration of morphine and atrophine in the beginning of treatment seems almost indispensable. Belladonna and hyoscyamus have a tendency to relieve the discomfort, and the prescription containing belladonna and bromides can sometimes be used to advantage.

Fever. Treatment as previously suggested, the prescription containing salicylates, together with the other measures, usually is all that is necessary for this symptom also. An ice bag to the head should be used when there is much elevation of temperature. Hydrotherapy can always be employed.

Gastro-intestinal Symptoms. These seldom require any special treatment other than the quiet, rest, care of diet, and medication as outlined. Where nausea or vomiting is a constant symptom, bromides and carbonated drinks are indicated.

Vaccines. Vaccines, particularly the autogenous, have been extensively employed with apparently a certain amount of success. This plan of treatment is worthy of consideration in the chronic types of the disease. In the acute stages they are hardly indicated.

Surgery.—Surgery is only indicated in those cases having a definite pathological condition that cannot otherwise be relieved, such as calculi, chronically diseased prostate, tumors, or diverticuli.

Complications.—Complications such as pyelitis would be treated the same way as when these conditions arise from some other cause.

DISEASES OF THE LIVER, GALL-BLADDER AND BILE DUCTS

JAUNDICE

General Statement. Definition.—This is a condition characterized by the abnormal presence of bile in the skin and other structures of the body. It is not a disease but a symptom, and one that may be the result of any of a great variety of conditions. Some writers treat one form particularly as a separate disease; namely, acute catarrhal jaundice. Many subdivisions are used, such, for example, as obstructive and nonobstructive jaundice; or jaundice resulting from changes in the liver, from changes in the blood, and from obstruction. Another grouping is hematogenous and cysto-hepatic. The principal subdivisions are those based on the etiology, as, for example, the jaundice of Hanot's cirrhosis and that of Weil's disease.

Incidence.—This condition is found from the early days of infancy to old age. All types and conditions of people may be affected, but some groups are more subject to certain types of the disease; for example, the "mahogany jaundice" of carcinoma is more frequently found in old age.

Etiology.—As previously suggested this covers a wide range of diseases, but the principal causes may be grouped under three heads:

First, general diseases, such as pernicious anemia, septicemia, and malaria.

Second, diseases of the liver, gall-bladder, and bile ducts, such as carcinoma, abscess, catarrhal inflammation, Weil's disease and Hanot's cirrhosis.

Third, obstructive conditions such as gallstones and pressure from tumors.

Course and Prognosis.—This depends entirely upon the cause. The course of the condition is often of considerable value from a diagnostic standpoint, as will be mentioned later.

Symptoms and Diagnosis.—As this condition is a symptom, it is hardly appropriate here to go into a detailed discussion of those evidences that tend to establish the diagnosis. The one essential finding is the evidence of bile in the body structures and secretions, as will be discussed later. The principal matter of interest here is its value as a symptom. The evidences will of course be influenced by the underlying cause, therefore, a great variety of findings are possible. In investigating jaundice among those factors of interest are the following:

History. The character of the onset, the duration of the condition, and the evidences of preceding disease are naturally of particular importance. For example, in the jaundice due to gallstones, the onset is probably sudden. In the acute catarrhal type, there is usually the history of a preceding acute gastro-intestinal disturbance.

Discoloration. This is the characteristic finding that is essential to a diagnosis. When the jaundice is slight it may be found only in the sclera and sometimes then only by pulling down the lower lid, as the patient looks up, and examining the lower part of the surface visible. The mucous membranes of the soft palate and lips may also show the condition early. The color of the skin may vary from a light yellowish tinge through the various shades up to a typical "mahogany." This degree of involvement is of value in establishing an etiological diagnosis. For example, in the milder cases the cause is often found to be some toxic process giving rise to the hematogenous type. In the bright yellow type the cause is usually acute catarrhal jaundice or some acute infection as Weil's disease. In the deeper shades of yellow we may suspect some obstructive process as gallstones, and the "mahogany" jaundice, particularly if marked and persistent, suggests carcinoma. The duration of the condition is of importance in establishing the cause. For example, if the discoloration shows a recurrent tendency, particularly if deep in color, some recurrent obstructive process as gallstones is suggested. The permanent persistent type suggests some persistent process as cirrhosis or carcinoma.

Nervous Phenomena. Jaundice usually gives rise to certain manifestations that are more or less definite. In the severer types particularly there is a tendency to headache, melancholia, lowered mental efficiency, restlessness, and insomnia.

Gastro-intestinal Symptoms. These are usually present resulting either from the disturbed bile function or from the underlying cause. There may be such symptoms as anorexia, dyspepsia, flatulence, constipation, nausea, and vomiting. There is a tendency toward a lowered state of nutrition, which is due largely to interference with the appetite and digestion particularly of fats.

Pain. This is a symptom that often leads to information of value both from its presence and character; for example, the dull, more or less constant pain of carcinoma (which may be almost or entirely absent), the recurrent paroxysms of gall-stones or the acute constant pain of inflammation.

Other Symptoms. There may be itching of the skin, which at times is particularly troublesome. Fever may or may not be present, depending largely upon the cause of the jaundice. In the acute catarrhal type or in the jaundice due to inflammation of the gallbladder, fever is usual throughout the acute course of the disease. The presence or absence of fever and the character of the temperature is of considerable value in establishing an etiological diagnosis. There is a tendency to sore gums, coated tongue, and bad breath.

Xanthopsia or yellowness of vision is not constant, and is of no value in determining the cause of the jaundice.

Liver, Gall-bladder, and Spleen. These may give information upon examination; for example, the smooth enlarged liver of Hanot's disease, the large irregular mass of carcinoma, the enlarged gall-bladder of certain obstructive conditions, the enlarged spleen of splenic anemia, or certain types of cirrhosis or malaria.

Laboratory. In all conditions of jaundice a thorough investigation should be made of the blood, urine, and feces, and much information can usually be obtained for establishing an etiological diagnosis. For example, an examination of the blood demonstrates the presence or absence of blood disease, malaria, and inflammatory processes. The feces in the obstructive type will show variations from the normal, such as the presence of undigested fat, and macroscopically the characteristic gray color indicating the absence of bile. The urine may present deviations from the normal, one of the most important of which is the presence of bile, at times this will be sufficient in amount to be quite evident macroscopically. A point of some value in differentiating between the obstructive and non-obstructive types is that the first has a tendency to more bilirubin and no urobilin, the second to less bilirubin and considerable amounts of urobilin. Ehrlich's aldehyde reaction is frequently of value.

X-ray. The *x*-ray should be employed and will often give information of value by directly showing the presence of stones or by the findings on cholecystography.

Prophylaxis.—This is included in the discussion of those conditions causing jaundice.

Treatment.—As previously stated, jaundice is a symptom and not a disease. While there are certain measures usually indicated in the symptomatic management, we shall discuss all phases of this subject under the heads of those etiological conditions. This will be done particularly under Acute Catarrhal Cholangitis.

ACUTE CATARRHAL CHOLANGITIS

General Statement. **Definition.**—This is a condition characterized by inflammation of the bile ducts; the adjoining part of the duodenum often participates in the process. The disease is frequently designated as acute catarrhal jaundice.

Incidence.—It is particularly a condition of early adult life, though it may occur at almost any age. The majority of cases develop in the third or fourth decades. It is more common among men.

Etiology.—As the majority of cases are of bacterial origin, it naturally obtains that any one of a variety of conditions can be directly responsible as contributing factors. Among these are constipation; improper eating, particularly of poorly prepared food, also food that is highly seasoned; alcoholism; physical or mental strain; exhaustion; and acute infectious diseases. In a large percentage of cases no direct cause can be assigned.

Course and Prognosis.—The outlook is almost uniformly good. The condition usually runs an acute course and the tendency is for the discomfort to subside in a few days and the other evidences to disappear in the course of a few weeks. If it does not follow this course, suspicion should be aroused that the condition is more than acute catarrhal inflammation of the bile ducts.

Symptoms and Diagnosis. History. This is of particular importance from the standpoints of eliminating other possible conditions and in establishing the somewhat classical sequence of events that is usually found in this disease.

Jaundice. This is the characteristic symptom; it develops rather slowly, being first noticed in the conjunctiva, next involving the face and then extending downward over the body. This discoloration is usually of a lemon yellow type, and a mahogany color should cause us to suspect some graver process being present. Often the bile appears in the urine before it is noticeable in the tissues of the body. The perspiration and saliva may also contain bile.

Gastro-intestinal Disturbances. There is usually a preceding period of acute digestive disturbance such as anorexia, nausea, or epigastric discomfort. The tongue is often coated and the breath has a disagreeable odor. Constipation is the rule, though at times there may be diarrhea. The feces usually assumes a clay color and develops a particularly disagreeable odor; these changes are due to large amounts of undigested fats and the absence of bile.

Nervous Phenomena. The tendency is to a rather marked depression; this is often decidedly out of proportion to the degree of other discomforts. There may be restlessness, nervousness, insomnia, dizziness, malaise, or any one of a variety of other types of involvement.

Pain and Discomfort. During the febrile stage, particularly, there is a tendency to headache, though this is not usually a marked symptom. There is often pain in the epigastric region, in the right hypochondrium and in the upper right abdominal quadrant; this pain may be referred to the back, particularly in the region of the scapula, due to the nerves in relation to those supplying the structures involved. There is frequently considerable tenderness in the region of the gall bladder. A large percentage of cases complain of more or less itching of the skin.

Fever. This is not a marked manifestation, but is usually present during the first few days. The temperature seldom rises beyond 100 or 101.

Liver and Gall-bladder. As previously stated there is often pain and tenderness in the region of the liver and gall-bladder; at times there is a distinct enlargement of the liver as will be found on palpation. There may be enlargement of the gall-bladder as evidenced upon physical examination.

Heart and Pulse. The pulse is rather slow, and may be dicrotic. There is a tendency to lowered blood pressure.

Laboratory. In some cases there is a slight increase in the total white blood count and the neutrophile percentage. A marked increase should arouse suspicion of a severer process than the one under discussion. The blood chemistry sometimes will give information of value. The urine usually shows bile macroscopically, and in addition to this there is a marked tendency to casts. Albumin is usually present in the early stages of the disease.

Differential Diagnosis.—This has been discussed in detail under the head of jaundice, (page 400).

Prophylaxis.—There is very little to be said in the way of prophylaxis other than the general measures looking towards correct living, particularly from the standpoint of eating and drinking.

Treatment. General Care.—During the febrile period absolute rest in bed is usually necessary, and this is particularly recommended where there is much pain or tenderness. There is a natural tendency to mental depression and the surroundings of the patient should be made as pleasant as possible. Thorough bathing, particularly tepid baths, not only promote comfort and cleanliness, but have some value as a therapeutic measure. Except in the presence of nausea, the patient should be encouraged to drink large quantities of water; this not only contributes to comfort but favors elimination and probably has some effect on the disease process.

Diet.—Often, in the early stages particularly, there is such a degree of nausea that it is practically impossible for the patient to retain any nourishment. In such instances small amounts of carbonated drinks may be given at frequent intervals, and skimmed milk with lime water. Cereal broths or malted milk may be tried. When there is no particular intolerance of food, the menu may include milk, strained milk soups, well cooked cereals, gelatin, custard and toast. The diet is rapidly increased as convalescence is established. Heavy foods, such as cold meats, highly seasoned foods, and alcoholic beverages should be avoided for a period, depending upon the condition of the patient.

General Medication.—Many agents have been suggested but there is nothing of specific value.

Hexamethylenamine has been used for many years. There is no scientific background for its employment, but many clinicians feel that it has a field of usefulness.

The salicylates have been largely employed. In the early stage of the disease, particularly when there is much general body discomfort, headache and elevated temperature, they may give symptomatic relief. Many combine acetylsalicylic acid and phenyl salicylate as in the following prescription:

℞

		or	
Acidi Acetysalicyl.,	gr. l	3	3
Phenylis Salicyl.,	g. lxxv	5	0
Bism. Subnit.,	gr. ccc	20	0

M. ft. cht. no. x.
Sig.—One every four hours till relieved.

Sodium salicylate is frequently employed.

Alkalies. Among these are the citrates, sodium bicarbonate, and magnesium oxide. They are often used in the form of effervescing drinks and where there is nausea they are best used in this way.

Olive Oil. Unless contra-indicated by nausea or diarrhea olive oil may be used, particularly in the form of a single dose at bedtime.

Special Measures. Lavage through the duodenal tube is thought by many to hasten the recovery of these cases. Colon irrigations have been used for generations.

Symptomatic Treatment. Gastro-intestinal Disturbances. These are among the most troublesome symptoms. Nausea is treated by rest, mental and physical, and by carefully adjusting the diet. Often the ice bag or hot applications to the epigastric region or small amounts of effervescent drinks given at frequent intervals, will be of value. Another preparation that may be tried is one tablespoonful of lime water to three tablespoonfuls of cold skimmed milk, every thirty minutes, other nourishment being withheld. Where medication is necessary, sodium bromide in 30 grain (2 Gm.) doses by mouth or rectum is probably most efficacious. The benefit of this may be augmented by the addition of alkalies.

Constipation. This may be relieved by colon irrigations. Where medication is used, the effervescing salines are desirable agents, among these effervescing sodium phosphate and effervescing magnesium sulphate are most largely used.

Nervous Phenomena. These are largely controlled by the measures of general care, such as rest, large amounts of liquids, a careful diet and relief from pain. Where medication is necessary the bromides usually meet the requirements. Small doses of barbital may be used, particularly if insomnia is a factor.

Pain and Discomfort. For the headache and general body pain that is often present in the febrile stage, acetylsalicylic acid alone or with codeine will usually meet the requirements. The local discomfort may often be relieved by the use of hot or cold applications. In the presence of elevated temperature, cold applications are more indicated. In the afebrile period hot applications usually give more relief.

Itching. There is no special treatment for this symptom. It is seldom very troublesome and spontaneously subsides as convalescence is established. It can be relieved by bathing or sponging with sodium bicarbonate and water. Alcoholic preparations, as witch hazel or witch hazel and bay rum will benefit. These applications may be followed by a massage with cold cream.

Fever. This is combated by the measures of general care, the ice bag and modified hydrotherapy. More than this is seldom necessary.

ACUTE INFECTIOUS JAUNDICE

General Statement. Definition.—This is an acute infectious disease characterized by jaundice, fever, gastro-intestinal disturbances, severe general pain and muscular soreness, enlarged liver and spleen, and more or less nephritis. It is often spoken of as Weil's disease.

Incidence.—While it may appear in all conditions and classes of people, it is more common among males, and particularly during the period of early adult life. The proportion of males to females is about nine to one. The majority of cases occur between the ages of fifteen and thirty. It appears sporadically or in epidemics. It is relatively rare in the United States. While the disease may develop at any season of the year, it is probably more common in the spring and fall, particularly in the fall. Certain classes are more subject to the disease, among which might be mentioned soldiers in war time, and civilians who work under unfavorable conditions, such as laborers in the sewers or rice fields.

Etiology.—Present evidence indicates that the exciting cause is the spirochæta icterohæmorrhagiæ (of Inara) and that the organism is transmitted by rats. It is certain that among the contributing factors is living conditions characterized by unhygienic surroundings.

Course and Prognosis.—The mortality, particularly in this country, is very low, few fatalities being reported. In some sections of the world it is considerably higher. The usual course of the disease is about ten to twelve days of fever, the jaundice appearing in two to four days with other acute symptoms and gradually beginning to subside about the fifth or sixth day. The temperature, as previously stated, subsides about a week later, the jaundice usually lasting two or three weeks. There is a tendency to relapse during convalescence; this occurs probably in about one-fourth of the cases. There is usually a prolonged period of disability during which the patient returns slowly to a normal state of well-being.

Symptoms and Diagnosis. History. The matter of occupation or exposure to unfavorable hygienic conditions should be investigated. The presence of an epidemic at the time naturally tends to establish a diagnosis. Valuable information can also be gathered from the standpoint of eliminating other conditions that might account for the symptoms present.

Onset. The onset is usually sudden, beginning as a rule with fever, rigors, headache, general body pains, particularly referred to the back and legs, muscular soreness and marked gastric disturbances. The jaundice usually develops about the third day and varies considerably in intensity.

Fever. This may be an early symptom, rapidly rising to as high as 103 to 105. In favorable cases this begins to subside after five or six days and, unless a relapse occurs, reaches normal before the end of the second week.

Pain. This is one of the characteristic evidences of the disease, and serves to differentiate the condition from some other processes that might be confusing. As a rule there is intense headache, severe body pains and muscular soreness.

Gastro-intestinal Symptoms. There may be anorexia, nausea, vomiting, extreme thirst, diarrhea (or constipation), and usually abdominal pain and tenderness. The tongue is usually coated.

Skin. There are several possible disturbances such as cutaneous hemorrhages, herpes and itching. The characteristic feature is a pronounced jaundice usually a bright lemon yellow in color.

Hemorrhage. Bleeding may occur from the gums, nose or various other structures.

Pulse. The pulse is usually not out of proportion to the temperature. There is a tendency to a slower pulse as the jaundice develops.

Liver and Spleen. These are usually distinctly enlarged.

Laboratory. The laboratory examination shows little characteristic of the condition other than the finding of bile and bile salts in the urine. There are usually the evidences of nephritis as albumin, casts and red blood cells.

Differential Diagnosis.—The principal disease from which this must be differentiated is acute catarrhal jaundice. The outstanding symptoms eliminating this latter condition are the presence in Weil's disease of marked pain and muscular tenderness, high temperature, enlarged spleen and renal irritation. Most other conditions characterized by jaundice may be differentiated by the sudden onset and acute stormy course of acute infectious jaundice.

Prophylaxis.—In the presence of an epidemic, particular care should be taken to guard against those conditions that are possible as exciting or contributing causes. In the present uncertainty as to the etiology, it is necessary to take into consideration all possible factors, which would include pure drinking water, properly prepared food, and certainly the elimination of rats, or at least the avoidance of direct or indirect contact with them.

Treatment.—The management of this condition is usually the same as that detailed under the discussion of acute catarrhal cholangitis (acute catarrhal jaundice), page 404. Many clinicians have recommended the use of the immune sera as advocated by Inara.

Symptomatic Treatment.—In a general way this must be worked out along the lines suggested in the treatment of acute catarrhal jaundice, though more active measures may be necessary to combat pain.

CHOLECYSTITIS

General Statement. Definition.—This is a condition characterized by inflammation of the gall-bladder. Many sub-divisions have been used by various writers, probably the most satisfactory being that adopted by Ferguson, Rehfuss, and others, which is somewhat as follows:

1. Acute cholecystitis
2. Membranous cholecystitis
3. Phlegmonous and gangrenous cholecystitis
4. Suppurative cholecystitis
5. Chronic cholecystitis

Incidence.—These conditions may occur at almost any age, they are particularly common in adult life, the vast majority of cases coming in the third, fourth, and fifth decades. All types and conditions of people may be affected, though some groups are more susceptible than others.

Etiology.—The exciting cause is probably always bacterial, while many other factors act as predisposing causes. Among the organisms most commonly found are typhoid and paratyphoid bacilli, colon bacilli, staphylococci, and streptococci. It is evident, therefore, that among the etiological factors must be considered infectious processes by these organisms elsewhere in the body, that may reach the gall-bladder in any one of several different ways:

1. Through the hepatic artery. It is probable that in this way the pneumococci, streptococci or staphylococci usually gain entrance.
2. Through the portal circulation. This is often the port of entry for the typhoid and colon bacilli.
3. By the direct extention of an inflammatory process in the region of the gall-bladder. In this group should be included the infections in the bile ducts, in other words, a cholangitis giving rise to a cholecystitis. It is rather improbable that infections through the bile ducts could take place by the direct passage up of organisms from the intestinal tract, as is sometimes stated. In fact, the possibility of any ascending infection is questioned by some good authorities. Where there are adhesions of the gall-bladder to the intestines, direct passage through is, of course, possible.

It should be borne in mind in considering the etiology of gall-bladder infections, that they may result from a morbid process almost anywhere in the body. The type of disturbance may also change; for example, a simple acute cholecystitis may later become suppurative in character. Many possible factors contribute in an indirect way to the incidence of the disease; gall stones especially play an important part.

Course and Prognosis.—This depends very largely upon the type of infection and whether or not the liver or other structures are involved. The presence or absence of gall stones is also of importance. The acute type of the disease tends to run a course of a few weeks and usually clears up without complications. The chronic type may clear up entirely or may continue indefinitely, usually being characterized by periods of remission and exacerbation. The suppurative and gangrenous types tend to run a stormy course, and carry a very high mortality, except where the patient has the benefit of prompt and efficient surgical measures.

Symptoms and Diagnosis.—These depend very largely upon the type of the disease, but there are certain findings common to all. It is for this reason that it is most convenient to discuss the various groups together, merely emphasizing the differences in symptoms and treatment when indicated. Many of the cases of gall bladder involvement occur in the course of and as the result of some disease elsewhere in the body; in these cases the symptoms arising from the cholecystitis may be largely or entirely overshadowed by the evidences of the primary condition. Again, the symptomatology may be considerably influenced by the degree of liver involvement. It should not be forgotten that in definite gall-bladder disease the liver in a large percentage of cases is also affected.

History. This is of importance to establish both the gall-bladder involvement and the particular type. It must include the character of the onset, as well as the consideration of all possible etiological factors.

Pain. There is usually pain in the region of the gall-bladder, that is in the upper right abdominal quadrant. This pain may be more or less continuous, or may be characterized by paroxysms, the paroxysms occurring particularly in the membranous type of the disease. In the chronic form pain may be largely or entirely absent for long periods of time. During the active process or in the severer types of the disease, as the suppurative, there is naturally a tendency to headache and general body pains, such as would be expected from an infection of like severity anywhere in the body. Any febrile case is naturally characterized by general discomfort. In many cases the pain is referred to the back or shoulder, particularly to the region of the scapula. This is due to the relation of the nerves supplying these parts to the nerve supply of the gall-bladder.

Tenderness. This is usually present, though in the mild forms of the disease it may be rather difficult to elicit; it is found by pressure just below the right costal margin. In the suppurative type of the disease, it may be pronounced. There also may be tenderness and cutaneous hyperesthesia in the region of the eighth, ninth and tenth dorsal segments. There is rigidity of the abdominal muscles, particularly in the region of the gall bladder. The degree of rigidity will depend upon the degree of involvement. The pain and tenderness in many cases give rise to shallow, rapid respiration.

Gastro-intestinal Symptoms. These are usually rather pronounced and depend somewhat upon the degree and type of the inflammation. There may be anorexia, nausea, vomiting, general abdominal discomfort, distention, constipation, or diarrhoea.

Fever. This may be entirely absent in the mild types of the acute or in the chronic cases. In the severer forms, there is usually considerable elevation of temperature. The suppurative type of the disease is characterized by high fever, and often by rigors and sweating.

Pulse. The pulse is usually increased in rate, the degree of change being influenced by the severity of the infection. The gangrenous form carries a high pulse rate, out of proportion to the other evidences of the disease. A pulse rate out of proportion to the other symptoms is usually of grave import, and should call for at least the consideration of surgical measures.

Jaundice. Jaundice may be present, though it is not a constant symptom. In the acute catarrhal type, the occlusion of the bile ducts often gives rise to this condition.

Gall-bladder. The gall-bladder may or may not be enlarged, depending upon the character of the process. When there is enlargement, it is often difficult to demonstrate by palpation, due to the muscular rigidity of the abdominal wall.

Liver. The liver may or may not be enlarged.

Laboratory. The blood usually shows an increased total white and neutrophile count, particularly in the suppurative form of the disease. The blood chemistry may give information of value, particularly as to the presence of cholesterin.

The urine shows nothing definite in many cases. Sometimes bile or bile derivatives are present. In the severer types of the disease, a certain amount of renal irritation will be evidenced.

An examination of the feces may show imperfect digestion of fats and the presence of bile or bile derivatives.

An important phase of the laboratory examination that has recently come into use is the examination of the bile obtained by the duodenal tube, but it is hardly within the scope of this article to go into a detailed discussion of this.

X-ray. This should always be considered a possible source of information. Visualization of the gall-bladder now constitutes one of the most valuable diagnostic aids.

Differential Diagnosis.—The region of the gall-bladder contains so many important structures that a differential diagnosis is sometimes fraught with extreme difficulty. Among the most common conditions that have to be eliminated are the following:

Gall-stones. It is necessary to differentiate between the presence of gall-stones with the concomitant discomfort, and an actual inflammation of the gall-bladder. This is done principally by the evidences of inflammation, such as elevated temperature and increased total white and neutrophile blood counts.

Hepatic Diseases. Diseases such as liver abscess and cirrhosis may present many difficulties, particularly when it is considered that often the liver and gall-bladder are both involved in the same process. The differentiation can usually be made only after a careful evaluation of all the available clinical data, such as the history, the character and location of the pain, palpation of the gall-bladder, and the x-ray findings.

Renal Diseases. In diseases such as pyelitis, or pyelonephritis, the urinalysis is of major importance. The differences in the location of the pain and tenderness both immediate and referred, will go far toward establishing a diagnosis. The pain of kidney disease is more to the back and the tendency is for it to be referred downward; the pain of gall-bladder involvement is more to the front, and it is referred upward.

Pleurisy. This may be difficult particularly where the lower costal or diaphragmatic pleura is involved. The history will usually give information. Pleurisy is almost always associated with cough, and there is a greater tendency to respiratory pain. The location of the tenderness and other available evidence will usually clear up any doubt.

Appendicitis. This is seldom a source of trouble, except in the chronic cases, and in many of these the gall-bladder and appendix are both involved. A misplaced appendix may also lead to error. A careful study of the many differences in the two conditions, such as the areas of pain and tenderness, the areas of referred pain, and the laboratory examinations, will usually establish a correct diagnosis.

Abscess. An abscess in this region, such as a perinephritic or a sub-diaphragmatic may at times have to be differentiated. This would lead to error only in the suppurative type of gall-bladder disease, and here a differential diagnosis may at times be impossible.

Ulcer of the Stomach or Duodenum. This may cause some confusion, but the relation of the pain to meals, the absence of fever, and the characteristic blood changes, the location of the pain, both local and referred, the laboratory and x-ray finding, together with other available data will usually lead to correct differentiation.

Prophylaxis.—There is nothing to suggest in the way of particular measures to guard against this condition.

Treatment.—Treatment will depend upon the type of gall-bladder involvement, and the presence or absence of other disease processes in the body. For example, a gall-bladder inflammation in the progress of typhoid fever will require different management from that where the gall-bladder is the only seat of trouble. The membranous, gangrenous, and suppurative forms are surgical conditions. The phlegmanous form is quite rare, is usually a surgical condition, and otherwise is treated just as the simple, acute type of the disease.

Acute Cholecystitis.—General Care. Rest is essential, the degree of rest depending largely upon the condition of the patient. The patient should be made as comfortable as possible. Careful nursing is necessary both for contributing to the comfort of the patient, and for watching for unfavorable developments. Quiet, freedom from worry, fresh air, proper warmth, and such other measures as contribute to well-being should receive attention. The patient should have the benefit of careful oral hygiene, and a daily cleansing bath. In the presence of fever of sufficient height, an ice bag should be used to the head.

Diet. Where there is much gastric disturbance, it may be difficult for a time to give nourishment. If there is much elevation of temperature, the diet should, of course, be much restricted. As a rule such articles may be allowed as cereal broths, malted milk, or similar preparations, skimmed milk with equal parts of barley water, simple carbonated drinks, and all the water the patient can well tolerate. As improvement justifies it, other articles may be added, as strained milk-soups, gelatin, custard, plain milk, and later well-cooked cereals, toast, etc. Alcoholic beverages and highly seasoned foods should be entirely eliminated.

General Medication. Many drugs have been recommended and many plans of treatment. Among these might be mentioned the following:

Hexamethylenamine. This is given in doses of from 5 to 10 grains (0.3 to 0.6 Gm.), dissolved in water, and while from the standpoint of pharmacology there is little ground for its use, clinically it may have some value.

Salicylates. These have been much employed. The sodium salicylate is given with sodium bicarbonate. Acetylsalicylic acid is also extensively used and in the presence of much discomfort or elevation of temperature it is probably the most desirable preparation. Phenyl salicylate is used alone or with acetylsalicylic acid.

The various alkalies, such as sodium citrate in doses of about 30 grains (2 Gm.), seem to be of value. Many have recommended calomel in small repeated doses of about $\frac{1}{10}$ of a grain (0.006 Gm.).

The duodenal lavage is being extensively employed. There is still much discussion as to its value, but it is certainly one of the available therapeutic measures. It also serves an important purpose in obtaining bile for laboratory investigation. I will not go into a detailed description of this process here, as it is hardly within the scope of this article. The reader is referred to excellent articles on the subject, particularly those by Lyon.

Symptomatic Treatment. Pain and Fever. Local applications will often be of benefit. In the presence of high fever, the ice bag is probably the most satisfactory. The hot water bottle, electric pad, or hot fomentations may be used. Codeine may be given at times either by mouth or needle; sometimes codeine and acetylsalicylic acid combined will be efficacious, particularly where there is fever and general discomfort. At times a hypodermic of morphine may be necessary.

Gastro-intestinal Symptoms. Among these nausea and vomiting are the most troublesome. They may be relieved by local applications either hot or cold, as previously suggested. Small amounts of carbonated drinks may give relief. If necessary sodium bromide in doses of 15 to 30 grains (1 to 2 Gm.) by mouth or enema may be used. Abdominal distention is usually relieved by laxatives, enemas, and careful diet.

Constipation. This may be relieved by small doses of salines, repeated as required. Among these the effervescent sodium phosphate and effervescent magnesium sulphate are most used.

Chronic Cholecystitis.—Acute exacerbations of this disease will be treated as outlined for the treatment of acute cholecystitis. During the more or less quiescent periods, the matter of general care is of primary importance. This should particularly include attention to diet and intestinal elimination. The patient should live a life free from dissipation. All measures should be used to promote general bodily health and maintain a proper state of nutrition. The diet should be sufficient to meet the requirements and be selected with considerable care. Highly seasoned food must be avoided and regular meals of moderate size should be taken. In the management of the low grade, chronic cases, olive oil seems of particular value. I have known patients that were free from discomfort as long as they took from ½ to 1 fluidounce (15 to 30 cc.) of olive oil at bedtime and upon discontinuing this measure, there would be a return of symptoms. I am unable to offer any satisfactory explanation. In the presence of mild exacerbations, which would hardly come under the head of the treatment of the acute disease, the following prescription has been used with apparent benefit:

℞		or
Hydrarg. cum Creta,	gr. x	0|6
Acidi Acetylsal.,	gr. l	3|3
Phenylis Salicyl.,	gr. c	6|6
Bism. Subnit.,	gr. ccc	20|0

M. ft. cht. no. x.
Sig.—One night and morning.

The duodenal lavage is being extensively employed in the treatment of this type of the disease and should be considered one of the measures at our command.

Surgery. This is at times indicated. In a general way it may be said that surgery is distinctly indicated in the following conditions:

First. Repeated attacks of acute exacerbation in the face of all measures of prevention.

Second. When the chronic process interferes sufficiently with the comfort and general well-being of the patient.

Third. An acute attack of sufficient violence to constitute a direct menace.

Complications.—Among the principal of these are the following:

Gall-stones. It is well known that in chronic cholecystitis there is a tendency to the development of gall-stones; therefore, this should be borne in mind in considering the treatment and prognosis.

Systemic Disturbances. Other disturbances as a result of the focus of infection are always possible, among these are arthritis, neuritis and nephritis.

Occlusion of the Bile Ducts. This is always a possibility. The stopping of the outlet for the gall-bladder will naturally result in retention of material that was being eliminated; in the suppurative infections particularly, this is fraught with much danger. Jaundice will result if the hepatic or common duct is blocked.

Perforation. Perforation with its disastrous spread of infection is also a possibility, particularly in the suppurative, phlegmonous, or gangrenous types of the disease. Prompt surgical interference is the only recourse.

CHOLELITHIASIS

General Statement. Definition.—This is a condition in which one or more calculi are present in the gall-bladder or the bile passages. It is commonly called gall-stone disease. From a standpoint of diagnosis and prognosis four types are recognized:

First. Where stones are present in the gall-bladder.

Second. Where stones are present in the cystic duct.

Third. Where stones are present in the common duct

Fourth. Where stones are present in the hepatic duct.

Another possible sub-group is where the stone is lodged at the ampulla of Vater.

Incidence.—This is distinctly a condition of adult life, the majority of cases occurring after the fortieth year. Women are more frequently affected than men. The white race is more subject to the disease than the negro.

Etiology.—The direct cause is usually, if not always, infection. The etiology is practically the same as that of cholecystitis. Various organisms have been incriminated, such as the typhoid group, colon bacilli, streptococci, etc. Contributing causes are stagnation of bile or changes in its character, as may result from many of the conditions affecting the general well-being of an individual. Among these are various disease states elsewhere in the body, improper eating, constipation, sedentary habits; and of course such factors must be included as age, race and sex.

Course and Prognosis.—The fact that so many autopsies show gallstones that have never given rise to sufficient symptoms to be suspected, proves that they are not incompatible with good health and long life. On the other hand the presence of gallstones is unquestionably a menace that at any time may produce unfortunate results. Once these begin to cause symptoms, there is a decided tendency to a continuance of such disturbances until the stones are surgically removed.

Symptoms and Diagnosis.—These may well be divided into two groups for consideration, the symptoms of the acute attack, and those independent of the acute paroxysms. In either case of decided importance is the history of preceding conditions that might be etiological factors, and of previous acute attacks or chronic disturbances that might indicate this class of trouble. The age, sex and habits of the individual should also be considered.

Acute Attack.—The onset is usually sudden and characterized by various phenomena that are more or less constant.

Pain. This is one of the outstanding symptoms of the acute paroxysms. It is usually felt particularly in the upper right quadrant, though it may be referred to various parts, as through to the lower costal region on the right side posteriorly or up to the scapula or shoulder. It may involve the entire epigastric region, or be more or less general over the abdomen. As a rule the pain is intense and there is a tendency for the patient to writhe and squirm and assume spectacular positions and make pressure with the hands over the region involved or place a pillow or some other object against that region. This is in rather sharp contra-distinction to appendicitis where every chance of contact is avoided. The acute attack may last for many hours unless adequate measures are employed for relief. They may occur at any time, but are more frequent during the middle of the night, usually between eleven and two o'clock, or about six to eight hours after the evening meal.

Nausea and Vomiting. There is usually pronounced vomiting and when the pain comes on in paroxysms, there is a tendency to emesis at every exacerbation. The vomitus at first consists of any food material that may be in the stomach. Later there is usually bile, resulting from regurgitation, that is in those cases where there is not an entire occlusion of the bile passages.

Chills and Fever. There may be chills or rigors; these may be repeated. There is often some elevation of temperature; a decided rise should arouse a suspicion of some complication.

Other Findings. When the pain persists long, there is a marked tendency to collapse. There may be cold extremities and profuse perspiration. The pulse is usually quick, though not markedly so. There is rather a tendency to dyspnea, one of the factors of which is probably a fixation of the abdominal muscles thereby lessening the function of the diaphragm. There may be tenderness in the gall-bladder region; in the beginning of the acute attack this may be largely absent, later on it is more pronounced.

Jaundice if present follows the acute attack within a day or two.

During the paroxysms it is difficult to get much data from palpation due to muscular rigidity, so it may be impossible to determine whether there is enlargement of the gall-bladder or liver.

Laboratory. This will be considered in the next section.

Recurrences. The acute attacks have a marked tendency to recurrence, sometimes being only a few days apart, sometimes months or years.

Diagnosis of the Presence of Gall-stones without the Acute Attacks.—This is a problem often fraught with much difficulty. Where a definite history of acute attacks can be obtained, the matter is largely simplified. Among the findings that may be of value are the following:

A pain or dull discomfort in the region of the gall-bladder, this usually shows a tendency to be intermittent, the patient sometimes having long periods of perfect comfort, and at other times more or less prolonged periods of inconvenience.

There is a decided tendency to digestive disturbances, particularly flatulence; there may be distinct evidences of intestinal indigestion resulting from the interference with the bile function, even when the ducts are not occluded.

There may be jaundice though this is not present in the majority of cases.

During the periods of discomfort there is usually some rigidity of the abdominal muscles in the upper right quadrant and tenderness on pressure. At times it is possible to demonstrate an enlarged liver or gall-bladder. In rare cases the presence of calculi has been demonstrated by manipulation.

X-ray. In either the acute attacks or the chronic state the *x*-ray will often give positive information. With modern facilities probably something like 40 per cent of calculi will show on the films. Gall-bladder visualization will establish a diagnosis in a good part of the remaining cases.

Laboratory. This may give information of value, and should include an examination of the feces to determine the status of the bile function. The urine and blood will usually give evidence only of aid in the differential diagnosis.

A diagnostic measure now being largely employed is that of the collection of bile by the duodenal tube and the examination of the aspirated material.

Differential Diagnosis.—There are many conditions that must be eliminated, among the most important of which are probably the following:

Cholecystitis. This may closely simulate either the acute attacks or chronic state of gall-stones. The acute paroxysm of cholecystitis, however, is not as violent in character; there is not the sharp pain, the tendency to collapse, and particularly the sudden onset.

Renal Colic. This causes pain of equal severity, but it is usually referred downward along the ureter and into the genitals. There is usually frequent urination. The microscopic examination of the urine and the *x*-ray will establish a diagnosis.

Appendicitis. This is usually more distinctly confined to the lower right quadrant; there is more tenderness and usually more febrile reaction; there is not the tendency to writhe and twist and make local pressure. The blood count and the investigation of other available data will be of assistance in establishing a diagnosis.

Gastric and Duodenal Ulcer. These do not usually give pain of such violence; the onset is not as sudden. The pain is not referred to the right back and shoulder; it usually has some relation to food, and it may be relieved by alkalies. An examination of the vomited matter and the feces may show blood. The *x*-ray usually gives evidence of value.

Crises of Tabes Dorsalis. This is seldom confusing, but at times has led to error. The location of the area of maximum intensity of pain, the tendency to referred pain, the general history of the case, the blood examination and the *x*-ray all give information which if taken together with a careful physical examination should make a diagnosis comparatively easy.

Prophylaxis.—There is very little that can be regarded as of particular value in preventing gall-stones, except the usual measures of correct living, such as careful attention to the diet, wholesome physical exercise, proper attention to elimination, and other matters that should be observed under all conditions.

Treatment. Treatment of Acute Attacks.—Once a diagnosis has been established, the first measure, unless there be some contra indication, is to administer a hypodermic of morphine and atropine; the average dose is 1/4 grain (0.015 Gm.) of the morphine sulphate and 1/150 grain (0.0004 Gm.) of atropine sulphate. It may be necessary to repeat this after a reasonable interval, though in the majority of cases one dose, combined with other measures, will meet the requirements. These patients should be in bed, but it is sometimes impossible to get them to lie quietly. There should be freedom from care and worry or any other disturbing factors. No food should be given. Hot fomentations to the area of involvement unquestionably contribute much to relief. Possibly the most satisfactory is hot turpentine stupes prepared by wringing a large folded bath towel out of very hot water containing oil of turpentine; these may be changed every few minutes. Care should be exercised to prevent blistering. When the pain subsides, treatment should be temporarily discontinued and the patient made as comfortable as possible in order to induce sleep.

Effort should be made between attacks to prevent their recurrence. Before the narcotic law was passed, a fairly large percentage of cases became morphine addicts. As previously stated, these paroxysms have a tendency to occur about midnight, and there were many cases where a physician rather than subject himself to these repeated night calls, would leave the patient a supply of morphine, or the patient learning what was being used would purchase his own medication.

Following the relief of the acute attack, the patient should be confined to bed several days, as the beginning of activity may precipitate another paroxysm. Also it should be borne in mind that in many of these cases there is quite a state of exhaustion from which it may require several days for the patient to recover.

Treatment Other Than for Acute Attacks.—General care as to diet and manner of living represents the majority that can be done in a palliative way. It has been stated that the keynote of treatment (as well as that of prophylaxis) is to secure and maintain a free flow of bile, lessening the tendency to stagnation or concentration, and the consequent deposit of solid matter. There is no known agent that will dissolve or cause the expulsion of these formations. These patients should use every means to maintain a state of good health, they may indulge in moderate, well regulated activity, going ahead with their daily affairs but avoiding over-exertion.

Diet. The food should be selected with care, be properly eaten, and excessive amounts avoided. It is better to take small, regular feedings. Any food that is well within the digestive ability of the patient may be given, although as a general rule fats and sugars should be reduced. Following an acute attack, the diet for a few days may consist of such articles as milk, gelatin, custard and cereals. It must be remembered that in these cases the digestive ability is usually impaired, this may be either gastric or intestinal or both, and the ability of the patient to handle food should be carefully observed.

General Medication.—Among the medicines that have been particularly recommended are the salicylates. Sodium salicylate, acetylsalicylic acid and phenyl salicylate, are most used.

Alkalies, such as the citrates, are recommended by some. Also small doses of calomel, oil of turpentine or ipecac. In using these drugs it must be remembered that the patient with gall-stones will probably keep them unless they are surgically removed, and the question arises as to what extent it is advisable to use such medicinal agents when the condition for which they are employed is a permanent one. The most common plan is only to give such medication when there is a more or less definite evidence of disturbance.

In spite of a lack of pharmacological grounds, I believe that the continual use of olive oil, preferably about ½ fluidounce (15 cc.) at bed time, tends to promote comfort in many of these cases and it is a measure that can be used without discomfort for an indefinite time.

Vaccines. These have been recommended, particularly where there is reason to suspect a present infection in addition to the gall-stones. Their value is at least problematical.

Treatment by the use of the duodenal tube is now being extensively employed; though its value is still a matter of dispute, it is certainly worthy of further consideration.

Surgery. Every gall-stone case is at least a potential surgical one, and the question of when to resort to surgical measures is one that is still unsettled; the surgical group of the profession is rather inclined to operate as soon as the presence of gall-stones has been demonstrated, the medical side usually takes a more conservative attitude.

After the stones have been removed and the gall-bladder drained, there are several unfavorable possibilities, such as the impaired function of the organ, the formation of adhesions and the recurrence of gall-stones.

If the gall-bladder is removed, the body is deprived of a structure that unquestionably has a definite function in life. Many and varied indications for surgery have been set down and the following at least can be safely stated:

When there are recurrent, acute attacks in spite of remedial measures.

Independent of acute attacks, when the general health of the patient is being impaired, comfort seriously interfered with, or activities reduced.

When there are acute conditions of sufficient gravity such as persistent pain, evidences of impacted stone or suppuration.

Complications.—Among these might be mentioned obstruction of the bile passages, jaundice, liver involvement, suppuration, local peritonitis, ulceration, perforation and intestinal obstruction. These are all surgical.

SUPPURATIVE HEPATITIS

General Statement. Definition.—This is a condition characterized by the formation of one or more abscesses in the liver. It is commonly called hepatic abscess, or abscess of the liver.

Various subdivisions are used by different writers, such as, septic, tuberculous, amébic, etc. They are also divided into acute, subacute, and chronic abscess. There are some advantages in a separate discussion of the septic and amebic forms, but for convenience they will both be discussed under one head, only the difference in diagnosis and treatment being emphasized as may be necessary.

Incidence.—This condition may occur anywhere and at any age; it is, however, more common among males, and in early adult life. The amebic form particularly is more common in warm climates, such as the southern part of the United States, Mexico and Central and South America.

Etiology.—The direct cause is an invasion of the liver by infectious organisms. Among these are the entameba hystolytica, colon bacilli, streptococci and staphylococci. Among the predisposing causes are foci of infection or infectious processes elsewhere in the body, such as endocarditis, septicemia, pyemia, typhoid fever, and various forms of dysentery and gall-bladder disease.

Course and Prognosis.—This depends to a large extent upon the infecting organism and the degree of involvement, also upon the general condition of the patient from the standpoint of the prior disease, such, for example, as septic endocarditis. Another important factor in the prognosis is whether there is one large abscess that lends itself to surgical relief, or whether there are many small ones where surgical measures are unavailable. In any event it is a serious condition always carrying a high mortality.

Symptoms and Diagnosis.—The symptoms may be largely influenced by the prior disease process, and in some cases they so overshadow the effects resulting from the liver involvement that the hepatic condition may be overlooked or a diagnosis be quite difficult.

History. This should include particularly an investigation of those conditions that might result in liver involvement. In amebic infection the history of a preceding dysentery or even of having lived in some place where amebic infection is endemic is highly significant. In the septic type of the disease, there should be a careful investigation as to possible infectious processes elsewhere in the body.

Onset. The onset in the tropical type is usually rather slow; in the septic type, it is apt to be stormy.

Fever. This is a constant finding, it tends rather to the "septic" type and is usually characterized by a wide range. In the amebic infection the temperature elevation is usually much less than in the septic form.

Chills. There is a decided tendency to chills and sweats in the septic type. To a large extent this is also present in the amebic abscess but may be entirely absent.

Pain and Tenderness. This is usually rather pronounced and is practically always present to a certain extent. There is the usual tendency to headache and general body pains, such as would be present in any febrile infection. There is pain and tenderness in the region of the liver, though this may not be pronounced or it may be late in developing. The pain is often referred to the back, particularly to the region of the scapula, and sometimes to the shoulder, due to the nerve relations. This pain is usually increased by motion or by lying on the affected side.

Pulse and Respiration. The pulse rate is usually not out of proportion to the temperature. The respiration may be quickened due to pain and mechanical interference.

Mental Phenomena. This characteristic is not necessarily out of proportion to the general condition of the patient. There may be such symptoms as nervousness, restlessness, insomnia, mental depression, and in the more serious cases delirium and coma.

Jaundice. Only about 20 per cent of the cases show a definite jaundice.

Rigidity of the Abdominal Muscles. There is usually rigidity of the muscles in the upper right quadrant and when the inflammatory process reaches the surface, this may be quite marked.

Liver. The liver is enlarged particularly from about the center downward; especially, the right lobe which is usually the seat of the involvement. Often the irregular type of enlargement may be evident on palpation.

Spleen. There may or may not be enlargement of the spleen.

Ascites. Ascites is sometimes present but is not a constant finding.

Laboratory. Liver function tests may give evidence of impairment. The blood, particularly in the septic type, shows an increase in the total white and neutrophile counts, characteristic of inflammatory conditions. The urine usually gives the findings of acute septic processes, such as albumin and casts. In the amebic infection the organism can often be demonstrated in the bowel content.

X-ray. This is often of value and should be employed in all suspected cases.

Aspiration. This is frequently employed and at times is almost necessary, but it is fraught with danger and should not be lightly undertaken.

Differential Diagnosis.—The main conditions that might lead to confusion are suppurative cholecystitis, carcinoma, empyema, subdiaphragmatic abscess and perinephritic abscess.

In carcinoma there is less tendency to fever, chills, sweats, etc., the process is not so stormy, and there is usually the evidence of involvement elsewhere in the body.

Empyema usually gives a history of a preceding cause, such as pleurisy or pneumonia. In addition to a distinct relation to the lungs, both the local and the referred pain are different in location. The *x*-ray and aspiration will finally establish the diagnosis.

In abscesses such as the perinephritic, the laboratory will usually give some information. The areas of pain and tenderness will usually show a decided difference. The *x*-ray and aspiration may lend considerable aid.

Prophylaxis.—In the amebic abscess the measures of prevention include the avoidance of the primary infection by careful attention to food and water, and to personal hygiene when it is necessary to associate with those infected. Also the prompt and thorough treatment of the intestinal process which precedes the liver infection.

In preventing the septic type of the disease we have to consider proper attention to all those conditions that are known as predisposing factors. There is no specific plan beyond this.

Treatment.—The first consideration is often the attention to the primary cause. It is recognized that as soon as the diagnosis is established, the case usually belongs to surgery. The outlook depends largely upon the extent to which prompt surgical measures may be employed. Where there are one or two large abscesses that may be emptied the patient should certainly have the benefit of this measure. Where there are multiple small abscesses surgery is usually not indicated and the case must be treated largely in a symptomatic way. The following paragraphs will discuss those measures that may be employed when for sufficient reason the case is not operated.

General Care.—As is the case of all seriously sick patients, absolute rest is essential. The patient should have the benefit of every possible comfort and favorable surroundings. The bed should be comfortable, and there should be sufficient ventilation, warmth, and quiet. The usual attention should be given to bathing, general care of the skin and oral hygiene. The patient should be encouraged to drink large amounts of water.

Diet. The diet must depend largely upon the general condition of the patient. During the acute stormy process, it may be possible to use such foods as cereal broths, strained milk soups (made with one-half milk and some cereal as rice or barley), malted milk or similar preparations (made up with water,) diluted fruit juices, carbonated drinks, etc. Later this diet may be increased as conditions justify it. Alcoholic beverages or highly seasoned foods should be avoided. Where the disease is protracted, maintaining adequate nutrition may become a factor of importance. It may be necessary to increase the diet as soon as the patient can tolerate food. Such articles are added as gelatin, custard, buttermilk, well cooked cereals, etc.

Change of Climate. At times a change of climate may be of value in the amebic type of the disease.

Vaccines. In the septic type of the disease vaccines have been used by many.

Ipecac. In the amebic infection, whether or not the case is operated, emetine by needle should always be employed. Later pills of ipecac may be given by mouth. Many clinicians prefer to give the patient the benefit of this type of treatment before considering surgical measures.

Symptomatic Treatment. Pain. This may be relieved by rest and the various measures of general care. The ice bag to the liver region may be of decided benefit. Codeine may be given by mouth or needle, or codeine and acetylsalicylic acid by mouth.

Fever. An ice bag to the head and to the liver region may contribute to relief. Sponge baths may be employed.

Other symptoms that may arise are treated just as the same conditions developing from other causes

CIRRHOSIS OF THE LIVER

General Statement.—There is considerable discussion as to just what should be included under this heading. The tendency is to confine this title to those conditions that are characterized by the more or less general overgrowth of the fibrous tissue of the liver. Many efforts have been made to classify the sub-divisions of this disease, but at the present time there is no uniform classification in common use. Chauffard uses the three general classifications,—vascular, biliary and capsular. Adami names eight groups, the first three of which he considers of particular importance and meriting detailed discussion. They are:

First. Portal cirrhosis. (This is further divided into six subdivisions.)
Second. Biliary cirrhosis.
Third. Obstructive cirrhosis.
Fourth. Paracellular cirrhosis.
Fifth. Arterial cirrhosis.
Sixth. Contralobular cirrhosis
Seventh. Secondary cirrhosis.
Eighth. Sporadic cirrhosis.

Some authorities protest for various reasons against the use of the common terms,—atrophic and hypertrophic.

Portal and biliary cirrhosis cover so large a majority of the cases seen in practice that only these groups will be discussed here.

PORTAL CIRRHOSIS

General Statement. Definition.—This is a condition that is characterized principally by the overdevelopment of the fibrous tissue, particularly in relation to the portal circulation. It is also called Laennec's or multilobular cirrhosis. Many subdivisions are sometimes given. Of particular interest is the grouping of these cases under the heads of alcoholic and non-alcoholic.

Incidence.—Males are more frequently affected, the proportion being probably three to one. The majority of cases occur between the ages of 35 and 55, the average age of death from the disease being about 48. With regard to the class of patients, those that are given to the use of alcoholic drinks develop the disease most frequently. Those partaking of highly spiced foods seem also to have a greater susceptibility. Some races of Asiatics show a particularly large incidence of this disease.

Etiology.—This is still largely in doubt although many theories have been advanced. The most commonly accepted theory today is that alcoholic drinks and highly seasoned foods, by impairing the integrity of the digestive tract, favor the absorption of poisons, or the invasions of bacteria which are carried by the portal circulation and give rise to this type of hepatic cirrhosis.

Course and Prognosis.—As previously stated, the average age of death is about 48. The disease is particularly persistent. The course may be rapid, death resulting in a few months, while other patients live ten or fifteen years or more. The average duration is probably about four years. While a fairly large percentage of these patients experience periods of considerable improvement, the actual damage that has taken place is never entirely repaired, and the ultimate outlook is highly unfavorable.

Symptoms and Diagnosis.—These may cover so wide a range that it is hardly possible to discuss all of the possible manifestations.

History. The history should include the age and sex, and any habits that are known to be etiological factors (particularly the use of alcoholics).

Onset. This is usually gradual and it is probable that the condition has in most cases progressed for years before medical advice is sought.

Early Subjective Symptoms. These are often disguised by the symptoms produced by the etiological factors. The chronic alcoholic individual naturally presents many abnormal effects that may obscure the early manifestations of cirrhosis. Among the first symptoms are gastric discomfort, nausea, anorexia, and dyspepsia. The patient may feel weak and listless and complain of lowered physical and mental efficiency. There seems to be particularly a tendency to mental depression and instability. There may be pain or tenderness in the region of the liver and spleen; or the pain may be referred to the distribution of related nerves, particularly to the back in the region of the right scapula or the right shoulder. Often this first takes the form of a dull discomfort or a sense of weight.

Later Subjective Symptoms. Later in the disease the symptoms become more pronounced. There may be abdominal pains, more or less marked tendency to flatulence and diarrhea or constipation, or these latter may alternate. The functional nervous condition may assume definite neurasthenic characteristics with physical and mental disability. Late in the disease there is a tendency to delirium and coma.

Objective Symptoms. Sooner or later there is a sallow complexion, often described as an earthy appearance. There is a marked tendency to emaciation which appearance, may be accentuated by the abdominal distention resulting from flatulence or ascites. The veins of the face and neck may dilate, and at times there is marked dilation of the veins on the abdomen giving rise to the "Caput Medusæ" about the umbilicus. Dilated venules on the cheeks are a frequent finding. There is a tendency to jaundice, though this is not as marked as in biliary cirrhosis, it occurs in about a third of the cases. It is not as deep as in the biliary type of the disease and it is rather transient in character. The skin is dry. There is a tendency to fever, particularly late in the disease, but this is not usually a marked symptom.

Hemorrhage. This is fairly common, resulting from varicose vessels. Hematemesis is sometimes the cause of death.

Liver. In this type of the disease sooner or later there is a tendency for the liver to contract. The size at any particular examination does not furnish very definite information, but if it can be established that the liver is showing a definite tendency to contract, it is of importance. Upon palpation the liver may be found to present a firm surface finely nodular in character.

Spleen. The spleen may be enlarged, but not to the same extent as in some other forms of cirrhosis. It is usually from one and one-half to twice the size of the normal organ.

Mouth. There is usually a coated tongue, disagreeable breath, and a tendency to changes in the mucous membranes, particularly of the gums. These may become swollen and tender, and bleed easily.

Ascites. This is one of the characteristic evidences in this disease, its incidence being variously estimated at from 30 to 80 per cent. The majority of clinicians agree that more than one half present this symptom. It is a rather late manifestation.

Among other findings that may be mentioned are the venous hum in the epigastric region and a bruit in the spleen area. These may disappear if tapping is resorted to but return as the fluid accumulates.

Laboratory. There is a tendency for the urine to show urobilin, an increase in urates, a decrease in chlorides, and an increase in acidity.

There may be albumin and casts. Ehrlich's Aldehyde reaction becomes progressively stronger. The blood sooner or later shows a secondary anemia which at times may be very pronounced. The ascitic fluid is usually of a yellowish color and has a specific gravity of from 1006 to 1015. The character of the fluid is often found to be changed on subsequent withdrawals, probably due to the development of other factors such as peritoneal involvement.

The *x*-ray examination may give information of value.

Differential Diagnosis.—This usually has to be established by a careful evaluation of all the available clinical data. In this the history is of primary importance, particularly as to alcoholism. The age and sex is also of value in differentiating this from other diseases. Among the conditions with which it might be confused are the following:

Syphilis. This can usually be eliminated by the history, the presence of other lesions, the serologic examination and therapeutic test.

Heart Disease. This may be differentiated from cirrhosis by the history and the evaluation of the data obtained by a careful physical examination.

Kidney Diseases. These can be differentiated from cirrhosis by the laboratory examination and by the data obtained from a physical examination, particularly the blood pressure.

Malignant Growth. This is distinguished from cirrhosis by its more rapid changes, by the evidence of the process elsewhere in the body, by the infrequency of splenic involvement, and by laboratory investigation especially of the ascitic fluid.

Gastric Ulcer. This may be differentiated from those cases of cirrhosis showing hematemesis by the characteristic burning pain of gastric ulcer; by the correlation of this pain and the taking of food; by the absence of involvement of the liver and spleen; and by the absence of ascites and edema of the feet. The laboratory examination especially of the gastric contents, will help. The *x*-ray should always be used.

Liver Abscess. In differentiating from this, the *x*-ray is of value. The absence of splenic involvement in abscess is suggestive. The history of previous amebic infection, the finding of ameba in the intestinal contents, the course of the fever, and the therapeutic test (emetine by needle) are all of importance.

Splenic Anemia. This may sometimes be particularly confusing. It is well understood that hepatic involvement is a constant finding in splenic anemia. Of importance is the history and the age of the patient, the order of involvement of the spleen and liver and the careful evaluation of all other available data.

Portal Obstruction. This is a more rapid and stormy process. Many of the somewhat constant findings of cirrhosis are, therefore, wanting.

Biliary Cirrhosis. This is distinguished by the careful consideration of all available evidence as the case progresses under continued observation. In biliary cirrhosis there is a pronounced tendency to a constant and marked jaundice, a lesser tendency to ascites, a greater tendency to hepatic and splenic enlargement, and many other differences that will be discussed in the consideration of that type of cirrhosis.

The treatment of portal and biliary cirrhosis are considered together.

BILIARY CIRRHOSIS

General Statement. Definition.—This is the type of cirrhosis characterized by the growth of fibrous tissue in relation to the bile passages in contra-distinction to portal cirrhosis in which the changes are particularly in relation to the portal circulation. Several synonyms are employed, such as infective, unilobular, hypertrophic, and Hanot's cirrhosis.

Incidence.—This is a disease particularly of early adult life, though it may occur at practically any age. The decade showing the greatest number of cases is that between the ages of thirty and forty. Males are more frequently affected than females, some observers estimating the proportion to be 60 to 40, some as high as 5 to 1.

Etiology.—Although still a matter of doubt, the tendency has been for many years to regard it as an infectious process. There is certainty that alcohol plays an unimportant role. Malaria, syphilis, and other infectious diseases seem to have little if any influence.

Course and Prognosis.—There is a marked tendency for the disease to pursue an irregular course, being characterized by periods of remission and exacerbation. It is usually a protracted disease, often running a course of from five to ten years; at times it may be short and stormy. The ultimate prognosis in a well established case is unqualifiedly bad.

Symptoms and Diagnosis.—The history of the case is of importance in establishing a direct diagnosis, as well as in the elimination of other conditions that might be complicating factors. The age and past history of the patient will also be of material assistance in differentiating the type of cirrhosis.

Onset. This is usually slow, and in many cases considerable damage has been done before medical advice is sought.

Early Symptoms. Possibly the first symptom is a general loss of efficiency, the patient feeling weak and unable to endure physical effort. There is also an early tendency to digestive disturbances, itching of the skin, and a feeling of discomfort particularly in the upper abdomen. These symptoms tend to increase as the disease progresses.

Gastro-intestinal Disturbances. There may be a loss of appetite, though the tendency to maintain a fair appetite is more pronounced in this probably than in any other liver disease. Nausea and vomiting, particularly in the morning, usually develop sooner or later. Dyspepsia is common, and there may be diarrhea or constipation, or these may alternate. There is a marked tendency to tympanites which condition may contribute materially to the abdominal discomfort. There is usually a coated tongue, and more or less halitosis.

The stools usually do not show the clay color found in almost all other conditions associated with jaundice.

Pain and Discomfort. One of the early and most constant complaints is of a feeling of weight or actual pain in the region of the liver and spleen. There is also a tendency to recurrent attacks of acute abdominal pain referred to the liver region. These are usually associated with an exacerbation of the jaundice.

Neurological Disturbances. There is usually rather marked mental depression and lowered efficiency. There may be such phenomena as insomnia, restlessness, irritability, and later, delirium or coma.

Nutrition. The nutrition is as well or better maintained in this than in other types of liver trouble of equal severity. There is, however, a definite body wasting. This may be at times accentuated in appearance by the abdominal enlargement which is most pronounced in the upper quadrants and is due to the enlarged liver and spleen. Sometimes late in the disease there is ascites.

Respiratory Symptoms. There is usually shortness of breath and an increased respiratory rate increasing in direct relation to the abdominal distention.

Heart. Here the impairment is usually of a functional type. Sooner or later the pulse will show weakness or irregularity.

Liver. This organ is enlarged and upon palpation presents a firm and smooth surface. At times the enlargement may be extreme, though as a rule it is not over 50 to 100 per cent increased in size. In the last stages there may be atrophy.

Spleen. This may be enlarged to several times the normal.

Ascites. Free fluid is not characteristic, and when present is usually due to another type of cirrhosis or some other condition; or it may be a symptom of the very late stage of this disease.

Jaundice. This is one of the characteristic symptoms. It usually begins early and is persistent, though it may show periods of remission and exacerbation.

Hemorrhage. Bleeding may take place from almost any of the usual sites. Hematemesis is common and purpura not infrequent.

Other Findings. Among the findings may be clubbed fingers or clubbed toes, enlargement of the ends of the long bones, or definite joint enlargement.

Laboratory. The blood shows the characteristics of secondary anemia, which may become quite pronounced. There is a definite tendency to leucocytosis, though this seldom reaches a very high count, from ten to twelve thousand being the usual number. There is a tendency to a low polymorphonuclear percentage. The urine gives very little in the way of definite findings. Bile pigment is fairly constant; there is seldom albumin or casts. The sugar tolerance is good.

X-ray. This may give information of value especially in estimating the extent of the process.

Differential Diagnosis.—There are many possible conditions that might be considered under this head, but only those of importance will be discussed here.

Malaria and Syphilis. These may be differentiated from biliary cirrhosis by the characteristic blood findings of these diseases, also by the history, the physical findings, and sometimes by the therapeutic tests.

Malignant Growths. These are more rapid in their progress and show a more rapid deterioration of the body as a whole. Also there may be evidences of the malignant process elsewhere in the body. The differences in the splenic involvement will also be of value in distinguishing the disease.

Abscess. This may usually be differentiated from biliary cirrhosis by the history, the acute course, and the character of the fever; also by the comparative absence of splenic involvement, by the blood picture, and the skiagraph. In the case of amebic abscess, examination of the feces may establish a diagnosis by the demonstration of amebæ.

Prophylaxis and Treatment of Portal and Biliary Cirrhosis

Prophylaxis.—As has been so aptly remarked, the prophylaxis of these conditions includes all those various factors that tend toward promoting a robust state of health. Of particular importance are the avoidance of alcoholics and excessive amounts of highly seasoned foods.

Treatment.—There is nothing peculiar to the management of these patients and instructions must depend upon the conditions found in each individual case. In a general way it may be said that rest is necessary here as in most diseases. Sooner or later it becomes imperative. There is no question as to the value of fresh air, sunshine, and general comfort, and especially the avoidance of exposure. It should be remembered that probably one-half of these cases are terminated by some other condition, indirectly a result of their lowered resistance. All alcoholics and all highly seasoned foods should naturally be prohibited. The patient should have the benefit of proper bathing, proper care of the mouth, and careful attention to the bowels. This will be discussed under the head of symptomatic treatment. There is a marked tendency to depression which calls for the avoidance of worry and responsibility as far as possible, and giving the patient the benefit of cheerful surroundings.

Diet.—There is no special diet for cirrhosis and the food must be regulated by such symptomatic condition, as the presence of dyspepsia, flatulence, constipation, diarrhea, or fever. Milk should be the mainstay of the diet and at times it may be necessary to restrict the patient exclusively to this article of food. It may be given in various modifications, such as plain milk, milk-shakes, milk soups (celery, potato, etc.). Unless contra-indicated, good wholesome fruits and fresh vegetables are desirable. As previously stated alcoholic preparations, highly seasoned foods and excessive amounts of food are to be avoided. Meats should be limited and the white meats such as the breast of chicken or fish are preferable to other kinds. Usually fats are not handled well.

The foods that can be taken without inconvenience should be given in sufficient amounts to maintain the nutrition of the patient and it is sometimes necessary even to give articles that may not be otherwise desirable in order to accomplish this.

Symptomatic Treatment.—As there is no specific treatment, attention to symptoms is about all that medicine can do in the way of aiding the patient. Among the various symptoms that may require special attention are the following:

Gastritis. This can usually be remedied by the proper attention to diet. If special medication is necessary, bismuth subnitrate has probably given better results than anything else. This is given alone or combined with magnesium oxide or other alkaline agents. If the gastritis is associated with sore mouth, potassium chlorate in 5 grain doses repeated every two or three hours for several days is of value.

Nausea. This also is usually controlled by attention to the diet alone. If it persists the treatment as mentioned above for gastritis will often meet the requirements. Sodium bromide in 15 grain to 30 grain (1 to 2 Gm.) doses may be used alone or added to the agents mentioned in the preceding paragraph.

Flatulence. This will be benefited by proper attention to diet. If there is much intestinal gas, asafoetida enemas give temporary relief. A good formula is ½ fluidounce (15 cc.) of tincture of asfoetida, ½ ounce (15 Gm.) of sodium bicarbonate, and ½ gallon (2000 cc.) of water. Many medical agents have been employed, such as bismuth subnitrate, asafoetida pills and various bile products. The condition is sometimes relieved by the administration of ½ fluidounce (15 cc.) of olive oil or liquid petrolatum at bedtime.

Constipation. This can often be prevented or relieved by proper diet. Sometimes enemas as suggested in the preceding paragraph have been given to advantage. ½ fluidounce (15 cc.) of olive oil or liquid petrolatum at bedtime is all that is necessary in some cases. Many prefer the use of effervescing sodium phosphate, or magnesium sulphate either plain or effervescing. Potassium bitartrate given in the arly morning is a very satisfactory drug and can be freely employed.

Diarrhea. This can usually be controlled by diet, rest, hot starch enemas, and other measures of general care. Where more effective medication is necessary, bismuth subnitrate or bismuth and paregoric may be used just as in diarrhea resulting from other causes.

Hemorrhage. The first consideration is rest. Morphine hypodermically may be used to advantage in some cases. An ice bag should be applied over the bleeding point if such can be determined. In the case of hemorrhage of the digestive tract all foods must be withheld for at least a day or two and then feeding resumed cautiously. Small amounts of milk and limewater may be given at frequent intervals as probably the safest article of nourishment with which to begin. Other measures, such as the use of calcium lactate, the various proprietary preparations, serums and blood transfusion, can be employed just as in the control of hemorrhage from other causes (See Purpura and Hemophilia).

Ascites. This may at times be influenced by rest and other measures of general care, such as intestinal elimination, the limitation of salt and liquids, and the use of diuretics and circulatory stimulants. Paraceutesis is often necessary.

Special Treatment.—Liver extract either freshly prepared or in the form of some of the proprietary preparations is being rather extensively employed, and excellent results are claimed by some clinicians.

Surgery. This has at times given very satisfactory results in the hands of good operators.

Complications.—The conditions that are sometimes classed as complications have been discussed under the heading of symptomatic treatment.

ACUTE YELLOW ATROPHY OF THE LIVER

General Statement. Definition.—This is a disease characterized by destructive changes taking place in the liver cells, accompanied by such findings as jaundice, fever, profound cerebral and gastro-intestinal disturbances, and hemorrhages. The disease is sometimes called icterus gravis. Fortunately, it is extremely rare.

Incidence.—Any race or type may be affected; it is more common in early adult life, one-half the cases occurring between twenty and thirty (Ferguson), though it may occur in childhood or advanced age.

Etiology.—There is still much doubt as to the etiology of this condition. It may occur as a terminal complication in some general disease, as syphilis or typhoid fever. It also may result from diseases of the liver or gall-bladder, as cirrhosis or cholecystitis. Possible predisposing factors are various forms of dissipation, as alcoholism and indiscretions of diet. The exciting cause is still uncertain; various organisms have been incriminated, such as the colon bacilli. There are many who believe that all of these are merely predisposing factors which, by breaking down the resistance of the liver cells, prepare the way for the invasion of some toxin from the intestinal tract.

Course and Prognosis.—The disease is usually fatal in from 10 to 14 days, though the course may sometimes be protracted into several months. While it is generally considered fatal and the claim is made that those cases that recover represent mistaken diagnoses, still there seems to be indisputable evidence of actual recoveries, though there is a certainty of permanent damage having been done.

Symptoms and Diagnosis.—The history is of particular importance from the standpoint of predisposing causes. Information may also be gained by eliminating other possible conditions that would account for the symptoms. The onset is very much like that of acute catarrhal jaundice, although it is usually a little more severe than the latter disease. After a few days, usually about a week, instead of clearing up, there is a decided change for the worse, the jaundice deepening and profound mental disturbances and hemorrhagic tendencies developing. Jaundice usually appears about the second or third day, just as in the catarrhal type of the disease. As the condition progresses, the jaundice becomes more pronounced and usually takes on a greenish tint. There is no tendency to remissions, the color progressively deepening. Fever is an early symptom and runs a higher course than in the simple catarrhal jaundice, often reaching 104 or 105. With the onset of severe symptoms (fifth to tenth day), the temperature may fall to even subnormal. The pulse is at first slow, as in most other conditions characterized by jaundice, and later becomes rapid and may be irregular. Gastro-intestinal symptoms are pronounced in the early stage of the disease; there is anorexia, nausea, and a tendency to emesis. As the disease progresses, the vomiting usually becomes intense, later it shows more or less blood and sometimes bile. There may be constipation early but later there is more apt to be diarrhoea, with considerable mucus and blood. As would be expected in a disease of this character, flatulence if fairly constant, particularly late in the process. Among the most characteristic symptoms are mental and nervous phenomena, these may closely simulate meningitis. In the beginning there may be restlessness very much as in the simple types of jaundice, but later on the mental phenomena become more profound. There is usually delirium, which may assume the form of active mania. This later goes into profound depression and coma, and there may be muscular twitchings or actual convulsions. Pain is not often a very troublesome symptom. There is usually headache and there may be considerable discomfort in the region of the liver, at times referred to the back. There is epigastric tenderness and often general abdominal discomfort. Body pains are sometimes present, and even more frequent is muscular soreness. Pain may also simulate that of meningitis. There is a decided hemorrhagic tendency and, as previously stated, there may be blood in the vomitus and the feces. There may also be cutaneous hemorrhages, epistaxis, and menorrhagia. The eyes show dilated pupils and later there may be strabismus. While there may be some temporary enlargement of the liver, one of the principal characteristics of the disease is the striking reduction in the size of this organ. Due to flatulence the area of dullness may be reduced even more than would be expected from the actual atrophy that had taken place. The spleen is enlarged.

Laboratory. The laboratory gives little in the way of direct information. Blood chemistry is of some value, particularly in demonstrating retention products due to the liver impairment. The feces may contain blood. Among the changes found in the urine are an increase in the ammonia, the presence of bile pigment, and evidences of liver damage by the presence of such products as leucin and tyrosin. Later in the disease the urine may show evidence of renal damage.

Differential Diagnosis.—There is seldom much room for confusion if the possibility of acute yellow atrophy is borne in mind. This disease is probably more often confused with acute catarrhal jaundice. It may be differentiated by the marked severity of the symptoms, the increase in the jaundice instead of its subsidence, the lessening of liver dullness and the marked cerebral disturbances; in other words, it is a more serious condition than the simple process. It is differentiated from other diseases characterized by jaundice, such as Hanot's cirrhosis, by the liver dullness diminishing instead of increasing, by the range of temperature, by the cerebral disturbances, and, in general, by the acute stormy course of the process.

Prophylaxis.—As the condition is so rare it would hardly be logical to suggest anything in the way of actual prophylaxis, particularly as little is known of the etiology.

Treatment.—This is very largely symptomatic, and nothing of direct value is known.

General Care.—The patient should have the benefit of all possible measures contributing to his well-being. Rest in bed is of course essential. Proper attention should be given to isolation from disturbing noises, to proper heating and ventilation, and to general body comfort. This should include also oral hygiene, cleansing baths, the use of the ice bag when indicated, and, as in all cases where delirium is a factor, the patient should be under constant observation.

The diet should be of the simplest possible character; milk diluted with one-half barley water, the simple strained soups made with one-half milk and some cereal (without meat), malted milk or some similar preparation made with water, and diluted fruit juices. These will usually meet the requirements. Where there is nausea these will have to be given in small amounts and at frequent intervals. Some have recommended rectal feeding entirely. Should the case be protracted, the diet will have to be increased, but it should be done with extreme care.

General Medication.—Among the agents that have been recommended are sodium salicylate in 15 grain (1 Gm.) doses, hexamethylenamine in from 5 to 10 grain (0.3 to 0.6 Gm.) doses, sodium bicarbonate in doses of from 30 to 60 grains (2 to 4 Gm.), the citrates in doses of 30 to 60 grains (2 to 4 Gm.), and horse serum given subcutaneously. The value of any of these is at least questionable.

Symptomatic Treatment.—Pain is a condition that often requires particular measures for relief. The ice bag to the head, rest and quiet, general comfort, and hydrotherapy may meet the requirements. Small doses of morphine have been particularly recommended. Codeine would probably meet the requirements with less in the way of possible disadvantages.

Nausea may be relieved by the measures suggested under the head of general care. Hot applications to the epigastric region or even cold applications may be of benefit. Small amounts of carbonated drinks may give relief. When direct medication is necessary sedatives may be used, but they should be employed in the smallest amounts that will meet the requirements. ½ grain (0.03 Gm.) doses of luminal-sodium or the bromides in moderate dosage may be tried.

Mental and Nervous Phenomena. The requirements here will depend upon the symptoms presented in the individual case. Often rest, quiet and comfort, the use of the ice bag, and modified hydrotherapy are all that is necessary. Codeine by mouth or needle may be tried, if indicated, or small doses of luminal-sodium.

Gastro-intestinal Disturbances. The diarrhea, constipation, or flatulence may often be relieved by colon irrigation; in fact, this is probably of advantage as part of the routine treatment. A satisfactory solution to employ is ½ ounce (15 Gm.) of sodium bicarbonate, ½ fluidounce (15 cc.) tincture of asafetida and ½ gallon (2000 cc.) of warm water.

Other symptoms are treated as the same conditions arising from other causes; for example, should photophobia develop, the room should be darkened; should the patient be annoyed with itching of the skin, sponging with sodium bicarbonate and witch-hazel or the application of cold cream may give relief; and high temperature may be met by modified hydrotherapy.

GASTRO-INTESTINAL DISEASES

ANOREXIA

General Statement. Definition.—This is a condition characterized by an absence of the normal desire for food. This may be partial or complete. It may also be acute or chronic.

Etiology.—The causative factors may include anything that impairs the physical or mental well-being of the individual. Among the most common causes may be mentioned the following:

It is often a conservative process of nature. It frequently happens that for some cause food, or full amounts of food, would be a disadvantage to an individual, and nature, therefore, removes the desire to eat.

The mental state is one of the most common conditions affecting appetite. Worry, anxiety, excitement, fear, mental exhaustion,—in fact, any deviation from the normal may find expression in this way.

Anything affecting the alimentary tract, whether functional or organic, may lead to anorexia. For example, sore tongue, sore gums, sore throat, excessive salivary secretions, functional or organic stomach trouble, liver or intestinal disturbances, all may lessen the desire for food. Any general disease, particularly if associated with asthenia, fever, or pain, impairs appetite. Very often there is a relative anorexia due to the fact that only undesirable food is available. This may refer either to the character of the food or to the way it is prepared or served.

Treatment. General Considerations. The first consideration is to search for and correct any pathological condition, functional or organic, that might be a factor. This will naturally require a thorough general examination. Any abnormal condition found should receive proper attention. This includes particular attention to the mouth, teeth, digestion, and elimination. Few things in medicine are more spectacular than the results sometimes obtained by securing for an individual proper chewing facilities, correcting constipation, and giving attention to such digestive abnormalities as hypoacidity.

Elimination of Improper Foods. Rice has aptly stated that all that is necessary in the case of many children is to reduce or eliminate sweets. Very often it will be found that the patient is in the habit of satisfying the demands of hunger with a pickle, a piece of candy, a drink of soda water, a chew of gum, or in some other way appeasing an appetite that was intended to be used for more valuable purposes.

Proper Time of Eating. We are largely creatures of habit, and one of the established habits of the human race is three meals a day. The child can usually be trained to eat three meals a day with comparative ease. An adult can be brought back to these habits and will probably eat better and handle his food better than when it is served irregularly. Not only that, but the meals should be properly spaced and so arranged as to conform to the hours of activity of the individual. Eating between meals, and particularly shortly before meals, always tends to impair the desire for food and the ability to take food at the proper time. Even a drink of water shortly before eating lessens the reflex that results from an empty stomach. In cases of intensive feeding very often the intake can be materially increased by shortening the intervals between feedings, as is so well demonstrated in the management of such diseases as typhoid fever and tuberculosis.

Proper Eating Conditions. This refers particularly to the environment at meal times. A pleasant frame of mind on going to the table, and the maintaining of this throughout the period, goes a long way toward improving appetite. There is an excellent custom in many homes that nothing unpleasant may be mentioned at meal times. There is an old saying that it is better to miss a meal than to eat in an unpleasant humor. It is particularly unfortunate to correct children at this time. Every physician can recall instances in which these little folks have eaten in such dread of making some error that would call down discipline, that eating time instead of being a period of rejoicing is one looked forward to with dread. Sufficient time always should be allowed for food to be properly masticated, and eating alternated with periods of rest, conversation, and laughter.

Proper Service. Much can be accomplished by beautifying a dining room. The table particularly should be made as attractive as possible. This will include not only absolute cleanliness, but flowers, dainty table service, and everything else that the circumstances of the family will permit. In serving food in the sick room the best tray, the best linen, the best china, and the best silver should be used. Another factor of some value in serving food to the sick is not to serve an excessive amount. For example, if two slices of toast are on the tray, both may be eaten; if there is a great pile, the patient may be discouraged or disgusted.

Proper Food. In a preceding paragraph the evils of improper food were mentioned. Much can be done in the way of catering to the taste of the particular individual. For instance bread in some form is one of the most valuable articles of diet. One child may like lightbread and eat it in almost any amount desired and not care for other forms of bread; yet we see cases where either through neglect or indifference, biscuits and muffins are served meal after meal, irrespective of the taste of the little patient. The food should be properly selected, properly prepared, and have sufficient variety to prevent the possibility of its palling on the appetite. Where it is desirable to increase the state of nutrition, it is important to serve foods with a high caloric value, such for example as milk, cream, and cereals.

Exercise and Recreation. These have a value both direct and indirect. They tend to increase the state of well-being and of good-feeling; they improve the mental attitude; they improve physical health. This is discussed in considerable detail under the subject of Under-development, page 551. It may be said here in a general way that any wholesome well regulated form of exercise or recreation is of value; such as setting-up exercises, gymnastic work, walking, golf, tennis, swimming, rowing, hunting, fishing, and horseback riding. For example, let the patient who cannot eat breakfast, get up in time to go through the following routine:

15 minutes setting-up exercises
Cold bath
Rubdown with rough towel
Walk 15 minutes
Sit down and relax 5 minutes
Go to breakfast in a comfortable room with a cheerful atmosphere to a well served meal

The results are sometimes spectacular.

Medication. In the majority of cases no medication is necessary unless there be some functional or organic defect to be corrected. Among the tonics that at times may be used to advantage are the following:

Elixir of iron, quinine and strychnine phosphate; compound solution of glycerophosphates (without sugar); tincture of nux vomica, (alone or with other bitters, as gentian); compound syrup of hypophosphites; and beef, iron and wine.

NAUSEA (AND VOMITING)

General Statement. Definition.—Nausea is that condition in which there is an inclination or tendency to vomit. Vomiting (emesis) is the ejection of the stomach's contents through the mouth.

These may be divided into two groups: 1st, those of central origin due to stimulation of the cerebral center; 2nd, those of peripheral origin, due to action on the nerve terminations in the upper part of the alimentary tract. These groups are also spoken of as centrifugal and centripetal.

This condition is important for several reasons. Much discomfort is entailed and there may be considerable reduction in efficiency. Appetite, digestion, and assimilation are prevented or lessened, thus interfering with nutrition. Emesis may be a direct menace in certain diseases and postoperative conditions. It may be a conservative process of nature as in hyperchlorhydria, acute gastric indigestion, and poisoning. As a symptom it is not without diagnostic value, particularly in such conditions as appendicitis and meningitis.

Etiology.—The possible causes are almost limitless. While the groups of central and peripheral origin are recognized the two often blend through both factors being operative.

Psychic impressions as from unpleasant sights, odors or even thoughts, or any profound emotion as grief, anger, or fear may be followed by emesis.

Functional nervous disorders such as hysteria, neurasthenia, and psychasthenia are often associated with more or less nausea and vomiting.

In migraine they are an essential part of the process.

Habit plays an important role in some cases.

Reflexes from pathological processes particularly in the region of the abdomen, as appendicitis, intestinal obstruction, gallstones, and renal calculi.

Toxemia, particularly that of intestinal origin.

Many diseases such as meningitis, dengue, and nephritis.

Any condition associated with violent cough, particularly pertussis.

Pregnancy and often menstruation, or any disturbance of the pelvic structures.

Among the causes purely peripheral are any functional or pathological disturbance in the stomach, esophagus, or pharynx, as obstruction, gastritis, ulcer or carcinoma, irritating foods, foreign bodies, and many drugs.

Treatment.—This can best be discussed under, 1st. General care, including diet and non-medical measures; 2nd. General medication, or that given for central action; 3rd. Local medication, or that directed at the nerve terminations.

General Care.—Rest is one of the most important aids to relief and often is all that is needed. It should be both mental and physical. It is best secured in a darkened room. The patient may be either in a recumbent or semirecumbent position. If sleep can be induced, success is won in the majority of cases.

An ice bag to the head and cold compresses to the forehead or throat are often of advantage. The same is true of heat to the epigastric region or abdomen. This may be applied in the form of an electric pad, hot water bottle, or hot compresses, but nothing heavy should be used. Counterirritation as from a mustard poultice or plaster may serve the same purpose.

In persistent cases, particularly, intestinal elimination must be maintained. When food material is the etiological factor this measure alone may meet every requirement.

When simpler measures fail, gastric lavage, in selected cases, may meet the requirements. Sodium bicarbonate in hot water is the solution of common choice.

Much can often be accomplished by suggestion; unfavorable psychic impressions may be removed or the patient's attention fixed along more satisfactory lines.

Diet.—This is important both for correcting the nausea and for maintaining the nutrition should the nausea continue.

A period of absolute starvation is usually desirable in the beginning of treatment. During this time, even water by mouth is prohibited;

in fact, in many cases water seems to be very poorly tolerated. This is not appreciated by the laity and it is not unusual to hear someone say, "he is so sick that he can't even hold water on his stomach."

Should the gastric intolerance persist, fluids, some nourishment, and the necessary medication may be given by rectum, either the Murphy drip or retention enemas being employed.

In extreme cases feeding by the duodenal tube may be resorted to.

In beginning alimentation by mouth one of the most satisfactory plans is to start with 1 tablespoonful (1 teaspoonful for a child) of some carbonated drink. The "dry" ginger ale usually answers well. These small amounts may be repeated at first every 30 minutes and later every 15 minutes if desired. Another drink that is employed in the same way is 1 teaspoonful of lime water and 3 teaspoonfuls of cold milk.

As the condition of the patient improves, the amounts of these liquids are increased, then other liquids or soft foods gradually added. These should be such as are easily handled by the stomach, and contain a minimum of refuse. Among the desirable articles are strained milk soups and cereal broths, gelatin, custard, and well cooked cereals. As the diet is further increased the following requirements should be kept in mind. Feedings should be small in amount, at frequent intervals, and the food should be non-irritating, easily digested, and free from refuse. Often an article of food that is particularly desired by the patient may be well tolerated.

It is well known that in some cases of a persistent tendency to emesis, solid food may be retained better than liquids.

An old scheme often resorted to by pediatricians is to give the little patient a small stick of plain peppermint candy and a small piece of toast, to be eaten slowly and without water.

In conditions like whooping-cough, particularly, maintaining nutrition becomes a factor of first importance. In such cases, irrespective of the tendency to emesis, the patient is fed at frequent intervals with highly nutritious food of a character that will be rapidly passed out of the stomach, in the hope that some of it will be saved before the next paroxysm occurs. The patient is fed again immediately after vomiting.

General Medication.—Bromides are probably the most satisfactory agents. The sodium or potassium salts are the ones of choice. To be effective the dose must be fairly large—usually about 30 grains (2 Gm.) every six hours till effect. When they are not retained by mouth, they are given, sufficiently diluted, in the Murphy drip or retention enema.

Luminal-sodium in small doses is frequently employed, usually about ½ grain (0.03 Gm.) every six hours till effect.

Alkalies have a distinct field of usefulness, particularly when there is gastric hyperacidity, or acidosis. Sodium bicarbonate and the citrates are most commonly employed. When they cannot be retained by mouth they may be given by rectum. They are often combined to advantage with a bromide.

When acidosis is a factor, glucose by Murphy drip serves a remedial purpose in addition to supplying a certain amount of nourishment. In frank acidosis glucose and insulin may be distinctly indicated.

Special Medication.—When nausea is the result of gastric irritation, indigestion, or intestinal toxemia, a large dose of castor oil is one of the most valuable agents. The first dose may be rejected but the second dose if given promptly is usually retained.

Bismuth subnitrate is used largely, and in many cases is beneficial. Cerium oxalate was at one time much employed.

Local anesthetics, as cocaine, are frequently employed but their field of usefulness is at most very limited.

Morphine may give temporary relief and induce sleep, but the patient is apt to awake with the nausea increased and perpetuated, this being particularly true of women. This phase of its action is often overlooked by the profession.

ACUTE GASTRITIS

General Statement. Definition.—The term gastritis should properly be confined to conditions characterized by inflammation of the stomach; however, a broader application is frequently employed and it usually includes simple conditions such as irritation by corrosive drugs. Gastritis may be divided into several groups, such as acute and chronic, primary and secondary. Sub-divisions of these are often used; for example, in acute gastritis there are the simple, atrophic, and phlegmonous types. While these sub-divisions are of interest, the disease will be discussed as the acute and the chronic, and attention called to the special types when necessary.

Incidence.—It may occur among any class or condition of people. It is found at all ages and at all seasons of the year. The simple types due to food are, naturally, more common during the warm season of the year when there is a greater tendency for food to spoil. It is probable that some foods, such as fruits and vegetables, are more apt to produce trouble. The large amount of iced or acid drinks consumed at this season of the year may also be a factor.

Etiology.—Many factors may be operative in producing acute gastritis, among these are the following:

Eating of Improper Foods. Such for example as those that are rough and irritating in themselves, those that are irritating through an excessive amount of condiments, those that are improperly prepared, and those that are spoiled. Excessively hot or cold foods may also be a source of trouble.

Improper Eating. Food that is satisfactory in itself, may cause trouble through being improperly prepared for the stomach. This may be the result of hasty or irregular eating, eating of excessive amounts, or improper mastication.

Conditions of the Mouth. Sensitive teeth or sore gums, may be contributing factors, not only through the toxins produced and the organisms swallowed, but by interfering with proper mastication.

The Swallowing of Irritating or Toxic Material. These include alcoholics, particularly in concentrated form, and any other agents that might have an irritating and destructive effect upon the mucous membrane, such as phenol or corrosive mercuric chloride.

Bacteria. The stomach may be invaded by bacteria either directly or indirectly. Usually it is a secondary involvement from a disease process elsewhere, as diphtheria or influenza.

Course and Prognosis.—This depends very largely upon the primary cause and extent of the damage. The simple acute disturbance such as results from dietary indiscretions usually subsides in the course of a few days. When the condition is the result of destructive agents or the invasion of microorganisms, the prognosis depends upon the causative agent, the amount of damage done, and associated conditions, as disease processes elsewhere. The age of the patient is also of importance, the outlook being more serious in the very young and the very old. The state of nutrition and the general condition of the individual must also be considered.

Symptoms and Diagnosis.—The evidences of the disease will depend very largely upon the various factors already suggested; that is, the cause, the extent of the inflammation, and the associated conditions particularly where the gastritis is secondary.

History. A careful investigation may reveal etiological factors not only valuable in establishing a diagnosis, but in outlining the prognosis and treatment.

Pain and Discomfort. This may be a dull sense of weight and general discomfort, or a burning pain of greater or lesser intensity. It may be more or less continuous, or paroxysmal in character. There is usually tenderness in the epigastric region. The pain may be temporarily relieved by emptying the stomach or it may be quite resistant to treatment.

Nausea and Vomiting. There is practically always more or less nausea, and emesis is not uncommon. It may subside when the stomach is entirely emptied, or continue for an indefinite period. The tongue is usually coated and swollen and the mouth may be sore. There is a tendency to a bad taste in the mouth and a disagreeable odor to the breath.

Hiccough. This is not uncommon, though it is by no means constant.

General Depression. There is usually a rather marked feeling of depression, malaise, and loss of appetite even in the mild cases. In the severer form, there may be extreme prostration and collapse with sweats, rapid pulse, and other signs of shock. There may be marked palpitation.

Fever. This is not a characteristic finding, though in certain types of the disease it is present.

Abdominal Discomfort. This is rather the rule, though usually it is not extreme.

The Skin. In the cases due to certain types of food, urticaria or erythema often develops.

Laboratory. The gastric analysis is of particular value as an inflammatory process in the stomach would usually show in the gastric contents mucus, blood, epithelial cells and pus. Finding that the stomach contained a large amount of undigested food eaten many hours before, is very suggestive from a diagnostic standpoint. In the case of corrosive chemicals, they may be found in the gastric contents.

Differential Diagnosis.—The principal conditions that have to be eliminated are hyperchlorhydria, gastric ulcer, acute gall bladder disease, and the gastric crisis of tabes. There are no special findings that will establish a positive diagnosis and it must be based on a careful consideration of all the available data, such as the history of the case, the character of the onset, the character and location of the pain and tenderness, the investigation of the gastric contents, the comparative absence of fever, and the elimination, through the absence of the characteristic findings, of other diseases.

Prophylaxis.—This is one of those conditions that in the majority of cases is the result of indiscretions and could have been prevented. Among the prophylactic measures of importance are the following: Careful attention to the chewing facilities. Proper eating, including slowness, thorough mastication, regularity, and no excessive amount of food at any time. Proper diet, avoiding food that is too hot, highly seasoned, indigestible, or that is known to be a source of possible trouble in a particular case. Temperance or rather total abstinence in the matter of alcoholic beverages. Proper care, particularly in the matter of diet, in all diseases that are apt to cause trouble of the type under discussion.

Treatment.—General Considerations. The treatment will naturally be governed, in any particular case, by the cause and the type of involvement. Where an irritating poison has been taken, the first step is naturally the emptying of the stomach and the administration of the proper antidote. In the infective case, the management is much influenced by the causative condition, and is largely the treatment of the primary disease, with special consideration to the gastric feature.

General Care.—In the acute attack, when there is reason to believe there is undigested food in the stomach, the first consideration is to remove it. Several plans may be considered and the selection will depend largely upon the history of how emesis has been brought about with least inconvenience in the past. Probably the most satisfactory method is to give the patient a glass of lukewarm water containing a teaspoonful each of sodium chloride and sodium bicarbonate; this should be followed in rapid succession by glasses of lukewarm water, each containing a teaspoonful of sodium chloride, until vomiting occurs.

The water should be taken with reasonable rapidity and not merely sipped. It should not be too hot nor too cold, as the lukewarm liquid is itself of some value. Emesis will often occur after the first glass, and seldom more than two or three glasses will be necessary. The principal advantage of this plan is that it is non-irritating, the liquid in being ejected easily brings with it any material that may be in the stomach, and after this has been done there is no continued nausea as is the case when most other emetics are used.

Another plan is to give syrup of ipecac, ½ fluidounce (15 cc.) for an adult, and repeat every fifteen minutes until the desired effect has been obtained. This is free from any danger of toxic effects, but the nausea is rather persistent. In selected cases apomorphine may be used by hypodermic, but this should not be employed where there are any contra-indications, such as depression or evidences of shock. It should be remembered that a dose of apomorphine is usually followed by several hours of sleep. The vomiting is violent in character and in some instances may persist for a period of rather disturbing duration.

Mustard, zinc sulphate, and many other emetics have been suggested, but they are open to criticism as the resulting nausea may be rather persistent in duration and their irritant action may accentuate the discomfort or damage. It should be borne in mind also that where a small amount of any emetic is introduced into a stomach filled with food material it may be quite some time before it has an opportunity to produce an effect on account of failure to come in contact with the gastric surface.

In many cases the stomach pump may be used to advantage, the stomach being washed out with a weak solution of sodium bicarbonate and medication introduced before the tube is withdrawn.

After the stomach has been sufficiently emptied, it is usually advisable to give some soothing agent, and, in most cases, a laxative. Many prefer a dose of castor oil immediately upon cessation of nausea. Liquid petrolatum may be used or the patient may be given only some bland beverage as milk with limewater.

In the case of chemical poisoning, an antidote should be introduced through the tube immediately after the viscus has been properly emptied. The patient should be put at rest and every means employed to secure comfort and sleep. All food should be withheld for a time, and if the condition is sufficiently serious, this may be advisable for several days the necessary fluids being introduced by rectum, either by the Murphy drip or retention enemas.

Diet.—This will depend upon several factors: the severity of the symptoms (as nausea and pain), the cause of the trouble, the general condition of the patient, and the possible damage to the stomach. In all cases of gastritis, the diet should be extremely limited in the beginning of treatment. In most cases water may be given freely.

A good beginning may often be made by using ½ fluidounce (15 cc.) of limewater with 1½ fluidounces (45 cc.) of cold milk every thirty to sixty minutes, this to be gradually increased and other articles added as indicated. Equal parts of barley water and milk, or a weak solution of malted milk, or similar preparation, may at times be well tolerated in small amounts. Albumin water is often used to advantage. An article of diet that may prove satisfactory is strained milk soup, such as celery or potato, made with one-half milk, and rice or barley. While the usual meat broths are not advisable, there is no objection to the palatable dish made by using just enough of the bony parts of chicken to give flavor to the finished product, cooking this with rice or barley for two hours, adding one-half milk, and straining.

As the patient improves, such articles may be added to the diet as gelatin with cream, custards, soft boiled eggs, milk drinks, and well-cooked cereals.

General Medication.—There is no specific treatment and in many cases it is well not to give any medicine at all, merely following out the plan of general care and proper diet. Where the trouble is the result of food, a purgative is usually advisable. As suggested in a previous paragraph, castor oil or liquid petrolatum may be used immediately after emptying the stomach; this is particularly indicated to favor the elimination of objectionable material that may have passed out of the stomach into the intestinal tract.

Many prefer to give calomel; Basler recommends a fairly large dose given at one time or in two portions, in preference to the broken doses. Milk of magnesia has the advantage of being alkaline and non-irritant to the stomach.

It seems reasonable to suppose that in the case of an irritated or inflamed condition of the stomach that some benefit would be obtained by the administration of bismuth subnitrate and alkalies, and a prescription somewhat as follows has been used with apparent advantage:

℞		or
Atropinæ Sulph.,	gr. 1/10	0 006
Bism. Subnit.,		
Magnesii Oxidi,		
Calcii Carb. Præc.,		
Sodii Bicarb.,	āā ʒiv	15 000
M.		

Sig.—Level teaspoonful every four hours till relieved.

Potassium chlorate in moderate doses, well diluted, has also been extensively employed, though many excellent authorities, as Osborne, do not approve its internal use.

The other medication that may be necessary will be discussed under the head of symptomatic treatment.

Symptomatic Treatment. Pain. It may at times be necessary to resort to a hypodermic, codeine is the drug of choice. In the majority of cases the pain will be relieved by emptying the stomach, carefully regulating the diet, and keeping the patient at rest. Applications to the epigastrium are often of distinct advantage, probably the most common being a mustard poultice. This may be prepared by using one tablespoonful of mustard, eight of flour, the white of one egg, and sufficient water. It should be made large enough to cover the entire area of discomfort and allowed to remain on long enough to produce redness. After it has been removed the skin should be cleansed, treated with cold cream, and then a hot water bottle, electric pad or an ice bag employed.

Hot turpentine stupes may be tried. They are prepared by wringing a compress, as a folded bath towel, out of hot water to which oil of turpentine has been added, and applying this over the area of discomfort. They should be applied very hot and changed frequently.

If there is much discomfort or nervous disturbance, as is frequently the case, relief may be obtained by the use of a retention enema containing the following prescription:

℞		or
Barbitali,	gr. xx	1¦3
Acidi Acetylsal.,	gr. xx	1¦3

M. ft. cht. no. ij.
Sig.—Use one by enema as directed.

One of the powders is dissolved in ½ fluidounce (15 cc.) of whiskey or brandy, about 4 fluidounces (120 cc.) of warm water added and the solution carefully injected into the bowel. Bromides alone or with chloral hydrate may be employed by enema.

Nausea. This symptom is usually relieved by emptying the stomach, using demulcent drinks, rest, regulation of diet, and the other measures of general care. Where it persists, sodium bromide may be used by enema, or small doses of luminal-sodium by mouth. The bismuth and alkalies recommended under general medication also tend to relieve this discomfort.

Collapse. This should be combatted as would the same condition arising from other causes. Even in the face of the gastric condition, if the stomach can tolerate it, aromatic spirits of ammonia is one of the most satisfactory agents. Caffeine may be given by hypodermic or coffee by rectum. At the same time such measures as proper position and body warmth should be employed.

CHRONIC GASTRITIS

General Statement. **Definition.**—This term is properly applied to those conditions characterized by actual inflammatory changes in the stomach wall. Several types or subdivisions are recognized, among these are the following:

The sthenic, or those characterized by excessive secretion of hydrochloric acid and enzymes; and the asthenic, or those characterized by diminished secretory function.

Simple chronic gastritis, where the inflammation is principally confined to the glandular structure; and the atropic and hypertrophic, where the process is characterized by more extensive changes as suggested by these terms.

The primary type resulting from the direct action of various causes, and the secondary, resulting from a primary disease process elsewhere in the body.

Incidence.—While any class of people may be affected, the condition is more common among those groups that are most subject to the action of the various etiological factors, thus a large percentage of cases are among men, and the greatest incidence in middle and late adult life.

Etiology.—In primary chronic gastritis, a fairly large number are the result of repeated or imperfectly cured acute attacks. The etiology therefore, is very much the same as that of acute gastritis, except that instead of resulting from one massive injury, it is more the reaction to "repeated small insults." Among these factors are the following: Alcoholism, particularly strong drinks, as whiskey and brandy. Excessive use of tea, coffee, and tobacco. Improper eating, as imperfect mastication from defective chewing facilities, eating excessively, the eating of improper foods, such as those that are too highly seasoned hard to digest, or too hot or too cold. Drugs play a fairly conspicuous part, particularly arsenic, mercury, and the salicylates. The latter are probably responsible for many cases due to the extensive use of aspirin by the public, and sodium salicylate being used without the proper neutralization of the hydrochloric acid present in the stomach. The reaction between sodium salicylate and hydrochloric acid forms sodium chloride and salicylic acid; the latter is precipitated and may be decidedly irritating.

Many diseases may give rise to a secondary gastritis. It has been said that any chronic disorder causing debility may lead to this trouble. Among the conditions that are of particular influence in the etiology are hepatic cirrhosis, chronic heart disease with its various complications, pernicious anemia; and splenic anemia.

Course and Prognosis.—This depends very largely upon the type of gastritis, the extent of the damage, and the general condition of the patient. An important factor also is the extent to which the individual can, or will, cooperate in the matter of treatment. Where there is a primary cause that can be removed, in the simple type of the disease, the prognosis is very good. Where extensive damage has taken place, this cannot always be repaired, but the patients can be symptomatically relieved and aided in adjusting themselves to the changed gastric ability. In any event the course of treatment is long and tedious.

Symptoms and Diagnosis. General Considerations.—Where the disease is secondary to some other process, the symptoms may be largely masked by the primary condition. Again the symptoms in a particular case may depend to a large extent upon the character and degree of inflammation. In many cases these patients are either primarily, or later become victims of functional nervous disorders that may tend to obscure the actual evidences of disease.

History. The history should include the investigation as to possible causes, not only in the habits of the patient, but from the standpoint of a primary trouble that might have given rise to a secondary gastritis.

Onset. The onset will usually be found to follow upon the appearance or subsidence of acute gastritis or to develop slowly with periods of remission or intermission.

Pain and Discomfort. One of the first evidences of the disease is usually a sense of pain or discomfort after meals. This may be rather transient or more or less persistent, and it is often associated with so-called heartburn; that is, a burning discomfort in the gastric region or along the course of the esophagus.

State of Nutrition. Nutrition is at first well maintained, but as the condition progresses, there is a decided tendency to loss of appetite or to erratic appetite, also for the patient to feel satisfied after taking only a small amount of food. These factors with others sooner or later tend to loss of weight.

Nervous Disturbances. As in most cases of chronic gastric disturbance, there is a decided tendency to impaired mental and physical efficiency and the development of functional nervous disorders, the patient becoming irritable, neurasthenic, and showing the various other manifestations of instability. Among these palpitation is often a prominent symptom.

Belching and Eructation. There is a decided tendency to belching and eructation. In the hyperacid type, the material brought up may be burning in character. In the hypoacid type, the food may be sour or practically unchanged.

Nausea and Vomiting. There is a tendency to nausea and vomiting; this may occur after meals, and a rather characteristic finding is the early morning nausea, or the vomiting of mucus which may contain bile.

Mouth and Tongue. The tongue is usually coated; it may be red and sore. There is often stomatitis, bad breath, disagreeable taste in the mouth, and impaired taste for food which aggravates the anorexia. There may be a rather marked increase in the amount of saliva.

Constipation. This is rather the rule, but is by no means constant.

Abdominal Distention. This with a certain amount of tenderness is present in a large percentage of cases.

Laboratory. The laboratory findings are of much importance in establishing a diagnosis and directing treatment. The result of gastric analysis will depend upon the type of the disorder, one group of cases, as previously suggested, showing hyperacidity, another group being hypoacid, in which there may be practically a total absence of secretion. The enzyme function may show various degrees of impairment. There is a marked tendency to an increase of mucus. The motor activity of the stomach may often be estimated by the careful and repeated investigation of the stomach contents.

The urine may show evidence of renal irritation, or contain considerable amounts of indican and an increase in the urates and phosphates.

Sooner or later the blood shows a secondary anemia.

X-ray. This is of importance in establishing the motor activity of the stomach, and in eliminating other causes that might account for the symptoms present.

Differential Diagnosis.—A diagnosis is established by a careful investigation of the history and the evaluation of all available data obtained through careful and persistent investigation. The principal conditions that might cause confusion are simple hypo or hyperacidity, ulcer, carcinoma and gall-bladder disease. The differentiation of these is discussed under the head of these diseases.

Prophylaxis.—The occurrence of secondary gastritis may be influenced to a certain extent by proper attention to the stomach in the handling of those diseases that are known to be etiological factors. This refers particularly to proper diet. The primary type may be prevented by correct living which especially includes abstinence from alcoholics, moderation in the use of tobacco, tea, coffee and condiments, and eating the right food in the proper way. Maintaining a state of well-being by rest, recreation and physical culture is also of importance.

Treatment.—General Considerations. The treatment will naturally be influenced by several factors. First, whether or not the condition is primary or secondary. If it is secondary, the main consideration is the removal of the primary source of trouble where this can be done. When the trouble is primary, the treatment is influenced by the type of the disorder, the extent of the damage, and the general condition of the patient, also by the extent to which the individual can cooperate in treatment.

General Care.—In the severer types of the disease, a period of absolute rest may be necessary. Here, as in all other rest cases, every effort should be made to make the patient as comfortable as possible, both in mind and body. Proper heating and ventilation must receive attention, as well as all of the many other details that go toward making the rest treatment effective. Where complete rest is not indicated, or after the period of rest, properly regulated exercises will be of benefit, the amount depending upon the particular case. They may include such as the setting up exercises, or carefully regulated gymnasium work, walking, golf, and other outdoor recreations. Proper bathing will do much towards maintaining a state of well-being. The mouth should be put in the best possible condition for chewing; this requires particular attention to the teeth, diseased teeth being removed, and, where the chewing facilities are inadequate, properly fitted plates employed. In many cases abdominal supports can be used to advantage.

Diet. This will depend upon the particular type of the disease, the extent of the inflammation, and the general condition of the patient. In the hyperacidity cases, the general plan of diet as suggested for hyperchlorhydria will usually meet the requirements. In any type there are certain general rules to be borne in mind:

First. When possible the food should be up to the nutritional requirements.

Second. As far as possible it should be within the digestive ability.

Third. It should be free from irritating material, easily digested, carefully prepared and properly eaten.

Depending upon the gastric condition, the patient may be given three regular meals a day or frequent small feedings. In the majority of cases, milk as such or in some of the many modified milk drinks is the sheet anchor of the diet; this applies particularly to the hyperacid type. It may be given in the form of milk, or milk with limewater or barley water, milk soups, milk drinks, or milk with other food, as gelatin or custards. Buttermilk is often well borne. Among the other articles of food sometimes advisable in either type are well cooked cereals, creamed potatoes, soft-boiled eggs, and toast. After the condition improves, additions may be made, such as well cooked grits, soft rice, breakfast foods, strained oatmeal, raw oysters, baked or boiled fish, broiled steak, and well cooked poultry (not fried). It should be borne in mind that it is not merely a simple functional disorder in these cases, but that there are definite organic changes. The patient should be cautioned against the use of those items of diet that might cause trouble, for an indefinite time. In the hyperacid group salt should be limited and condiments practically prohibited. In all types of the disease such food as pickles and all highly seasoned dishes should be avoided.

Special Measures. Gastric Lavage. This is an important part of the treatment of some cases, and it is particularly applicable in those characterized by an excessive amount of mucus or by marked retention. The type of lavage and the solution to be used must naturally depend upon the requirements of the particular case. Where there is excessive mucus, an alkaline solution is desirable. Bassler recommends 2 ounces (60 Gm.) of sodium bicarbonate in 2 quarts (2000 cc.) of water. Where there is much irritation, silver nitrate may be used, about 1 to 2000 being the average solution; this should be repeated until ten or twelve treatments have been given. Care should be exercised to remove all the silver solution to prevent argyria. Another solution sometimes used is potassium permanganate (about 1 to 5000). The lavage is best done as long after meals as possible, and particularly before breakfast. If this is not practicable, it may be done before lunch or before the evening meal, giving the patient a period of rest following the treatment. In the majority of cases it may be repeated daily for about a week or longer, as indicated.

Electricity. Electricity has been used with apparent success and has many adherents. It is a measure that may contribute to relief.

General Medication.—In the hyperacid case the treatment as outlined under the discussion of hyperchlorhydria will very well apply here. The following prescription may be employed:

℞		or	
Atropinæ Sulph.,	gr. 1/10	0	006
Bism. Subnit.,			
Magnesii Oxidi,			
Calcii Carb. Præc.,			
Sodii Bicarb.,	āā ʒiv	15	000
M.			
Sig.—Level teaspoonful in water 3 times a day.			

In the hypoacid case hydrochloric acid may be of value. At times it can be combined to advantage with tincture of nux vomica, as the following prescription will illustrate.

℞		or	
Tinct. Nuc. Vomicæ,	fʒiv	15	0
Acidi Hydroch. Dil.,	f℥i	30	0
Liq. Pepsini Arom.,	q.s. f℥vi	180	0
M.			
Sig.—Two (2) teaspoonfuls in water with meals.			

Symptomatic Treatment.—Among the symptoms that most commonly disturb the patient are anorexia, nausea, and pain.

Anorexia. Anorexia is probably best combated by measures looking toward improving the general health, such as properly regulated exercise and recreation. The manner of serving food may often do much towards improving the appetite. At times bitter tonics may be used to advantage.

Nausea. This usually responds to the treatment previously outlined, such as general medication, modified exercise, and carefully regulated diet. At times it may be necessary to give some agent as sodium bromide or bismuth subnitrate.

Pain. Pain is usually controlled by the measures previously mentioned. Hot applications to the abdomen may be of advantage. These may be used as outlined in the discussion of relief of pain in acute gastritis. Properly fitted abdominal supports may tend to relieve chronic discomfort. The proper dietary measures will do much towards relief. Bromides or codeine will meet temporary requirements.

HYPOCHLORHYDRIA (AND ACHYLIA GASTRICA)

General Statement. Definition.—Hypochlorhydria is a condition characterized by a deficiency of hydrochloric acid in the gastric secretion. Achylia gastrica is the condition in which there is not only complete absence of hydrochloric acid, but of enzymes also. These conditions are so intimately related that it is probably best to consider them as one group, or as different stages of the same process: that is, a subnormal condition of the secretory function of the stomach.

It is usual to recognize two types, primary and secondary, the primary being that form in which no known cause can be ascertained, and the secondary that group in which the gastric condition is the result of some other primary disturbance.

Incidence.—Almost any age, class, or condition of humanity may be affected. There is naturally a tendency for this disease to occur in the later years of life when there is a lessening of general functional activity. Another factor that tends to place it later in life is the stress and strain of the active years of business life, and the punishment to which many stomachs are subjected by improper living and repeated attacks of disease. The secondary type is naturally most apt to occur during that period of life, and among those classes of people that are subject to etiological conditions, as discussed in the next paragraph.

Etiology.—Many persons have a normal low acid content, just as many have a normal slow pulse. Among the causes of the primary type are emotional states, such as worry or anxiety, and exhaustion following sustained mental effort. Under this head should also come the functional impairment that goes with a generally impaired state of well-being. A neurotic background seems rather definitely responsible for many of these cases.

Among the conditions responsible for the secondary type are most of the exhausting diseases, such as the anemias, particularly the pernicious form; exophthalmic goitre; carcinoma, tuberculosis, pellagra, dysentery; and gastritis.

Course and Prognosis.—This depends largely upon certain factors, one of which is the cause. If the cause can be found and removed the gastric function can usually be brought back to normal. Another factor is the conditions of treatment; that is, to what extent the patient can cooperate in such matters as diet, recreation, and change of environment. Most cases are characterized by remissions, intermissions and recurrences.

Symptoms and Diagnosis. General Considerations. In the secondary group the symptoms may be largely overshadowed by the causative disease. In establishing a diagnosis much depends upon a careful analysis of the history, especially as to the presence of possible etiological factors, the progress of the condition, and the results of previous treatment.

There is a decided tendency to loss of weight. These patients are usually undernourished, this, of course, is not an absolute rule, and the recent cases may not show any material impairment of nutrition. It stands to reason, however, that a process that is characterized by a partial or total absence of some of the most important factors in the digestive processes, would, naturally, tend to malnutrition. Another factor is the discomfort caused by taking food, the patient often voluntarily refraining from taking sufficient nourishment in order to avoid inconvenience. The appetite may be good, bad, or indifferent, the tendency being toward impairment.

Gastric Discomfort. This is one of the most characteristic symptoms; and a diagnosis can often be made upon this factor alone. It is of advantage here to contrast the gastric discomfort of this condition with that of the hyperacid groups. In hypoacidity there is discomfort rather than pain, and it comes on promptly after eating, instead of about two hours later.

As to the duration of discomfort, in hypoacidity it usually subsides after the stomach empties. In hyperacidity the pain usually begins after the stomach empties. In other words, here the patient is usually comfortable with an empty stomach, and in the hyperacid group he is usually comfortable with a full stomach.

There is an absence of burning, the complaint being more of a sense of weight, fullness, or oppression. In rare cases there is a nocturnal pain, which may be quite severe.

Eructation and Regurgitation. Should the food regurgitate, as it often does, it is not acid or burning, but is more or less unchanged, or it may be bitter. It does not leave the burning sensation characteristic of hyperacidity.

Diarrhea. This may be present, though it is not constant.

Headache. Headache may occur, though it is not as constant as in hyperacidity.

Nervous Phenomena. There are no characteristic mental or nervous phenomena, though there is at times a tendency to neurasthenia, mental depression, and nervous irritability. There may be lowered mental efficiency. These largely result from the impaired nutrition and frequent discomfort.

Laboratory. A careful evaluation of the findings upon repeated gastric analyses usually gives a positive diagnosis.

X-ray. This is of value for eliminating organic diseases and showing motor function.

Differential Diagnosis.—The most important considerations have been discussed in the preceding paragraphs. Carcinoma is discussed as such.

Prophylaxis.—There are no particular considerations of value other than those that apply to the maintaining of general good health. Proper eating is, of course, highly important.

Treatment.—The principal factor in treatment is to find and remove the cause, if such can be located. The next matter of major importance is attention to the general upbuilding of the patient; both the mental and physical condition must be considered.

General Care.—It is necessary to individualize, as the management will depend largely upon the condition of the patient and the extent to which cooperation can be obtained. Sometimes a change of environment, as a trip to the seashore or the mountains, will be of benefit, particularly in the beginning. It is highly desirable that whatever change, if any, is made, should be one that is pleasing to the individual. All should have the benefit of proper diet, outdoor recreation and pleasant surroundings. I have sent these patients in summer for an extended cruise on the Great Lakes, or up into the Canadian woods; however, the vast majority of cases will have to be treated at home and in most cases it is not necessary even to consider their removal.

Depending upon the physical condition of the patient, rest and recreation must be properly balanced to produce the best results. When not contra-indicated, the simple setting-up exercises, outdoor walks, and mild recreation, such as golf, fishing, hunting, swimming, kodaking, or any other form of diversion that takes one out of doors, will be of advantage.

Regular baths, either graduated or cold, followed by a rubdown or massage, are excellent.

Attention should be given to a sufficient intake of water and proper intestinal elimination.

The mouth and teeth should be kept in good condition.

Open air sleeping is of advantage.

Diet. This is the most important part of the treatment. As in most other gastric conditions, there are several considerations that must be borne in mind. One is that the food must be up to the nutritional needs of the patient, yet, as far as possible, within his digestive ability. If possible, the diet should be so arranged as to stimulate the secretory function of the stomach. The point has been well taken that if the diet be confined to food that requires the minimum of hydrochloric acid for digestion, the function will diminish, because there will be no stimulation of the glandular activity. Again, food in these cases must be thoroughly masticated; the action of mastication alone on the gastric function is too well understood to require detailed discussion at this point. The food should be of such a nature and so prepared as to come approximately within the impaired digestive ability. In the severe type of case, at least, instructions and diet should be written out in detail, and articles of food added as the tolerance of the patient indicates. Mild cases need have only general instructions.

Among foods that usually meet the requirements are: Milk as such or in the form of milk soups, milk shakes, etc. Some patients do not handle milk well, but in most instances it is the main reliance. At times the milk may be treated with hydrochloric acid in sufficient amount just to produce a faintly acid reaction. In many cases buttermilk will be well tolerated. Meat soups and meat broths containing some cereal, as rice or barley, may be given. In severe cases these are to be strained by passing through a course sieve, and one-half milk may be added. Lentil purees are recommended by some. Soft vegetables, as potatoes or carrots, may be given, but they should be mashed and beaten up with milk. Soft boiled eggs, gelatin, and custards while containing considerable amounts of proteids are usually well handled. Fruits are well borne, also the various breadstuffs, particularly when cooked crisp or toasted. In the mild cases, or in convalescence there may be added such foods as broiled steak, properly cooked poultry, and broiled or baked fish. In the hyperhlorhydria cases, all condiments are prohibited and salt restricted. In the stomach condition under discussion, condiments and sodium chloride are an advantage.

General Medication.—Hydrochloric acid is the main reliance in treatment. In cases characterized by diminution or absence of hydrochloric acid, supplying this deficiency, naturally goes far toward at least temporary relief. The diluted acid given in doses of 15 to 30 minims (1 to 2 cc.), well diluted with water, is employed either before, during, or after meals. It is advantageous at times to let the patient try out what seems best to meet the requirements of the particular case. It should be remembered that the amount of hydrochloric acid necessary will depend, to a certain extent, upon the amount and character of the food. It is of advantage at times to order diluted hydrochloric acid as such, and let the patient diminish or increase the dose, depending upon the conditions just mentioned. It should be emphasized that when the acid is discontinued, it should not be done suddenly, for reasons that can be well understood. It might be compared to a sudden withdrawal of support from a crippled man. It should be diminished a drop or two each day, the effect of this being carefully noted, and the stomach being given a reasonable opportunity to adapt itself to the changing conditions.

Many bitter tonics have been recommended; of these nux vomica is the most desirable. The extent, if any, to which they stimulate the secretory functions of the stomach is still not definitely established, but clinically they seem to be of some value.

Below are given some prescriptions illustrating the use of hydrochloric acid and nux vomica:

℞		or
Tinct. Nuc. Vomicæ,	f℥ss	15|0
Acidi Hydroch. Dil.,	f℥j	30|0
Aquæ,	q.s. f℥iij	90|0

M.
Sig.—Teaspoonful in water three times daily as directed.

This may be given half before and half after meals, or the entire dose may be given either before or after meals; some patients put this amount in a glass of water and drink it during the meal:

℞		or
Acidi Hydrochlor. Dil.,	f℥iij	90|0

Sig.—Thirty (30) drops in water after meals.

℞		or
Tinct. Nuc. Vom.,	f℥ij	60|0

Sig.—Thirty (30) drops in water before meals.

Sometimes better results are secured by changing this order and giving the nux vomica after meals and the acid before.

Pepsin is used by many in these cases, its value is still questioned. It may be ordered as follows:

℞		or
Tinct. Nuc. Vomicæ,	f℥ss	15|0
Acidi Hydrochlor. Dil.,	f℥j	30|0
Ess. Pepsini,	q.s. f℥vj	180|0

M.
Sig.—Two (2) teaspoonfuls in water with meal.

Symptomatic Treatment.—Anorexia, when present, is usually relieved by the treatment previously outlined. Headache, nausea, constipation, and nervousness are also usually controlled by the plan of general treatment. If other complications should arise, they would be treated as those conditions arising from any other cause.

HYPERCHLORHYDRIA

General Statement. Definition.—Hyperchlorhydria is a condition characterized by an excess of hydrochloric acid in the stomach. The over-production is usually in direct relation to meals. It should be borne in mind, as Piersol so aptly implies, that there is a wide variation in the range of what constitutes a normal acid content for different individuals, just as there is of pulse rate and other physiological factors. As a rule a total acid content of 50 (0.2% HCl.) is considered the upper limit of normal. Over 60 almost certainly constitutes hyperacidity. This refers to the stomach content as obtained one hour after the Ewald's test breakfast of a slice of toast and a glass of water taken after a twelve hour fast. As a matter of fact, it has been well demonstrated that the laboratory investigation should not be confined to this particular method, but recourse should also be had to the fractional method elaborated by Rehfuss and others.

Incidence.—It is probable that the majority of functional stomach disturbances belong to this group. It is most common among young adults, and particularly those who are well-to-do. The brain worker is more apt to be affected than one earning his living by manual labor. It seems to be more common among those who are subjected to sustained mental stress and strain. It is certainly more frequently found among those with a nervous imbalance.

Etiology.—Hyperacidity is a condition resulting from any one of a number of diseased states; for example, it may be found in certain stages of pellagra, gall-bladder disease, or chronic appendicitis. In a large percentage of cases, however, no organic disease can be demonstrated as the direct cause. Among those conditions that seem to influence the development of this functional disturbance are nervous instability, sustained mental stress, insufficient outdoor recreation and physical activity, irregular eating, (particularly confining the food intake to one large meal a day); improper eating, (particularly eating without proper mastication and insalivation); the eating of irritating foods or of foods that are hard to digest, the use of alcohol and tobacco, constipation, and gastric stasis from any cause.

Course and Prognosis.—The condition once established has a marked tendency to persist, alleviation of symptoms may be prompt, but as a rule the condition recurs when the patient is relieved from restrictions. One of the reasons for this is that the treatment is not usually persisted in for a sufficient length of time to change the secretory function of the stomach. Again, it should be remembered that if the patient goes back to the error that first caused the abnormal function, a recurrence is to be expected. Gastric ulcer should always be considered as a possibility for the future.

Symptoms and Diagnosis. General Considerations. At times the symptoms may be masked to a large extent by the presence of chronic gall-bladder disease, appendiceal trouble, or some other abnormal condition. Again, it should be borne in mind that gastric or duodenal ulcer may be present and materially affect the whole picture. In establishing a diagnosis, a careful analysis of the history of the case is by far the most important part of the investigation. Next to this comes the laboratory, the physical examination, and then a painstaking elimination of other conditions that might account for the symptoms found.

Onset. The onset is usually slow, beginning as an occasional discomfort, or discomfort arising only after some particular dietary indiscretion. It will usually be found that there were more or less prolonged periods of complete comfort, these gradually growing shorter in duration.

Gastric Pain and Discomfort. This should be investigated for the following facts:

Character. It is usually described as a burning or stabbing pain. The burning type of pain is most often complained of, the patient stating that he feels as though he had swallowed a live coal. This is in contra-distinction to the sense of weight or heaviness of hypoacidity.

Time. The average time of onset is about two hours after meals, and lasts for a period of from one to several hours. The time of onset depends to a large extent upon the character and amount of food taken; the larger the meal, others factors being equal, the later the development of the pain. It should be borne in mind that the discomfort is the result of the acid gastric juice coming into contact with the sensitive gastric mucosa; so as long as there is sufficient bland food in the stomach to dilute this acid, the patient is fairly comfortable. This is in contra-distinction to the discomfort of hypoacidity, which comes on during or soon after the intake of food and subsides as the stomach empties.

Location of Pain. It is usually complained of as being more in the epigastric region, the exact area depending to a large extent upon the location of the stomach. The pain is also sometimes referred to the back, particularly to the left.

What Increases the Pain. These patients are usually aware that certain foods cause distress. They will often state that they do not eat pickles, acid fruits, or vinegar dressings because they cause discomfort, in some cases they have unconsciously omitted these articles of diet until they simply do not want them. In other words nature has protected them by removing appetite for material that should not be taken. Missing a meal may give rise to the usual train of discomforts, particularly headache.

What Relieves the Pain. The vomiting of the acid material, the intake of soft bland food, or the taking of alkalies, usually gives prompt and more or less complete relief; this is a valuable diagnostic point. Most patients that have had this condition for long learn these facts and are more or less confirmed users of sodium bicarbonate or other alkalies. While others have learned that even better than this is a glass of cold milk.

Heart Burn (Esophageal Discomfort). The regurgitation of acid material causes discomfort in the esophagus which is the condition usually complained of as "heart-burn." In many cases these patients can map out the course of the esophagus by what is complained of as "a burning streak."

Eructations. There is a tendency to eructation of acid material; as previously explained, this may cause esophageal discomfort, and should it reach the mouth, the patient often complains rather bitterly of the burning it causes. It is sometimes hard to have them differentiate between the burning of the acid and the bitterness of other types of regurgitated material.

Vomiting. This may occur though it is by no means constant. Many patients realize that vomiting gives them relief, and often induce this by various means; sometimes they acquire a habit of frequently emptying their stomachs for this purpose.

Headache. The frequency of this condition in hyperacidity has not been sufficiently stressed; headache is a very common expression of this condition. It may be the migraine type or the simple frontal headache; it is sometimes referred further back, especially in the neurotic subject. It may be violent in character or simply a dull discomfort. The patient is often conscious of the fact that there is a direct relation between the gastric discomfort, the omission of food, or certain dietary indiscretions, and the headache. It promptly subsides upon treatment of the underlying cause.

Appetite. The appetite of these patients is usually good, and they may drink large amounts of water. Many realize that the frequent taking of a moderate amount of food gives relief. It is probable that the full appetite is partly a compensatory act of nature. Also it must be remembered that hypersecretion may mean rapid digestion, and the prompt emptying of the stomach into the intestines thus giving rise to an early hunger reflex.

State of Nutrition. The state of nutrition is usually good, as is to be expected of those with an over-digestion, a good appetite, and a desire to take frequent nourishment. This is in contra-distinction to the findings of hypoacidity where there is a tendency to impaired appetite, and the conscious or sub-conscious realization that food causes distress. In cases where the nutrition is impaired, it is usually the result of the voluntary act of the patient in trying to find relief through the omission or curtailment of the menu, or in trying to follow some prescribed treatment.

Laboratory. The investigation by the Ewald's test breakfast and by the fractional method will demonstrate a persistently high acid content and usually will show impaired starch digestion.

X-ray. This is often of value in eliminating organic diseases and in showing the motor function of the stomach.

Differential Diagnosis.—As previously stated, it is important to establish the presence or absence of complicating conditions, such as chronic gall-bladder disease or chronic appendicitis. The main trouble in a differential diagnosis is to distinguish simple hyperchlorhydria from hyperchlorhydria associated with gastric ulcer. In ulcer the symptoms are usually more profound from every standpoint. The pain is more severe, and there is more apt to be local tenderness and abdominal rigidity. Of particular value is the finding of occult blood in the stools or of blood in the gastric content when trauma may be eliminated. The string test and the x-ray will often give evidence of much value in establishing the diagnosis.

Prophylaxis.—The prevention of hyperacidity resolves itself into the matter of general health and proper living, and constitutes one of the reasons for educating the public in the ways leading toward a state of general well-being. This would, naturally, include temperance, or abstinence in the use of tobacco and alcoholics, the avoidance of irritating foods, careful eating at regular intervals and in reasonable amounts, proper intestinal elimination, and in general maintaining the proper state of nutrition and nervous stability.

Treatment. General Considerations. The remedial measures will depend upon many factors, such as the severity of the symptoms and their response to treatment, but particularly upon the primary cause. If there is any associated condition such as gall-bladder disease, appendicitis, oral sepsis, or constipation, it must be relieved, and often this will do more towards permanent cure than all other measures combined. There is a functional nervous disturbance in many of these cases that can be overcome by proper attention. It is unquestionably a fact that measures promoting general health and a general state of physical and mental well-being do accomplish much. This was well illustrated during the world war. There are few doctors who were practicing during that time, who cannot remember many patients with gastric disturbances of this type, who went to war and, being subjected to the system and routine of army or navy life, were entirely free from their discomforts during the period of service, but soon after discharge lapsed back into their former routine and again developed their previous symptoms.

General Care.—As previously emphasized, this is a very important point in the management of such cases. In a general way it may be said that anything looking to an improvement in the state of well-being is of advantage. At times it is necessary to begin with a complete rest cure, but modified activity is of such advantage that it should not be too long delayed. In most cases from the very beginning, and always sooner or later, proper physical training and outdoor recreation are essential. The management here will depend upon the age and condition of the patient and the extent to which he can lend himself to treatment. The following routine is suggested:

About one week of complete rest, or modified rest, as indicated. This should certainly be carried out if the patient begins with the milk diet.

The next stage should include walking and the setting-up exercises to which may be added gradually other forms of activities, with an increase in the setting-up exercises and in the distance walked. Such additions may be made as golf, swimming, and later tennis. Hunting and fishing properly carried out are often of particular value in securing mental relaxation.

One of the principal difficulties is to secure continued cooperation. Patients have a tendency to begin to relax in carrying out the routine as soon as the symptoms are sufficiently relieved. It is well for such cases to be under professional supervision at least for several months, and to be seen not less than once a week during that period, afterward at longer intervals.

The patient should have the benefit of proper bathing, preferably cold baths or graduated baths ranging from hot to cold, and always followed by a massage and rubdown, or at least by a rubdown with a rough towel.

Alcohol and tobacco play a very large part in the etiology of this condition, and they should be prohibited entirely if possible. Where this cannot be done, they may at least be restricted; of the two I believe that tobacco, particularly the more or less constant use of cigarettes, causes the most damage.

Diet. This is the most important part of the treatment and, without proper management of the diet all other measures are practically useless, not only that, but it should be understood from the beginning that dietetic measures must be persisted in for a long time. Even after the condition has been completely relieved a return to former dietary indiscretions may cause a redevelopment of the trouble. Complete, detailed diet instructions may be found on page 468. Here we will lay down only the general principles.

While these patients are usually in a good state of nutrition, it is, of course, necessary to give enough food to maintain the proper status; in other words, the diet must conform to the nutritional needs.

All food should be excluded that the patient knows may cause discomfort, or that we know from our understanding of the condition as a whole might cause trouble. This would exclude acids, particularly such as pickles; food that is hard to digest, as cold roast pork or sausage; food that is rough and insoluble, such as bran or oatmeal; and all food that is slow in digesting. It can be well understood that as long as a portion of undigested food remains in the stomach nature brings out the gastric juice in an effort to digest it, just as with a foreign body in the eye, tears are secreted. The following suggestions will help:

In giving eggs let them be soft boiled. When oysters are taken they should be raw, not fried. Potatoes should be served mashed, and preferably beaten up with milk and butter, instead of as Saratoga chips. Condiments should be entirely excluded.

It is probable that a reduction of sodium chloride has direct benefit in these cases, and it is my custom to restrict its use, particularly during the period of intensive treatment.

Food should be taken at regular intervals, and several small feedings, slowly and thoroughly chewed, should always be insisted upon; and this must be emphasized in the written schedule of instructions.

As far as it is practicable, the patient should be encouraged to maintain a pleasant frame of mind during meals, and to take a rest after meals of from 15 to 30 minutes.

Very hot or very cold foods should be avoided, also excessive amounts of sweets; and in some cases any sugar at all is disturbing. Simple fats, as unsalted butter and olive oil, are of advantage.

General Medication.—Many drugs have been recommended, and some have proved of definite value, among which the most important are bismuth in the form of the subnitrate or subcarbonate, magnesium oxide, sodium bicarbonate, and belladonna or its alkaloid, atropine. The magnesium oxide has a much larger acid combining power than sodium bicarbonate; and it has the additional advantage that it does not liberate carbon dioxide in neutralizing hydrochloric acid. It is also a laxative; and while this quality is often of value as a side effect, in many instances the laxative quality of the drug prevents its being given in sufficient amounts to meet the requirements of treatment. It is, therefore, customary to combine magnesium oxide with other agents somewhat as in the following prescription:

℞		or	
Atropinæ Sulph.,	gr. 1/10		006
Bismuthi Subnit.,			
Magnesii Oxidi,			
Calcii Carb. Præc.,			
Sodii Bicarb.,	āā ʒiv	15	000

M. ft. cht. no. xv
Sig.—One powder three times a day as directed.

This may also be ordered in bulk, to be put in a wide-mouth bottle, and the patient instructed to begin with a level teaspoonful.

Many patients, particularly women, show an idiosyncrasy to belladonna and atropine.

The following schedule of treatment may serve as a working basis in the management of these cases:

First Period (3 to 7 Days). Take a glass of milk (or milk and cream) every one to two hours when awake. Drink water frequently, as wanted. One tablespoonful of olive oil (plain) at bedtime. A glass of hot water upon awaking each morning. A dose of the powder in a glass of water morning, noon, and night. Nothing else to eat or drink.

Second Period of Treatment (1 to 2 Weeks). Eat three meals a day. Two hours after meals take a dose of the powder in water. One hour after the powder, take a glass of milk. Continue the olive oil at bedtime and the hot water in the morning.

Diet during Second Period. Water, milk, milk-shakes, strained milk soups, gelatin, custard, soft boiled eggs, toast, butter, well-cooked grits, cornmeal mush, cream of wheat, soft rice and mashed potatoes. No condiments, and very little salt.

Variations. The duration of the first and second periods of treatment will depend largely upon the condition of the individual patient. After the first week, the powder may be reduced in amount to one half and later to even a smaller fraction of the original dose. If there be much nervous irritability, sodium bromide may be given in 15 to 30 grain (1 to 2 Gm.) doses, as indicated. Tincture of belladonna or atropine may be given in the prescription, given separately, or omitted, depending upon apparent requirements. The amount of olive oil may be increased or diminished, depending upon the tolerance of the patient, particularly to its laxative effect. It may be necessary to reduce the magnesium oxide for the same reason. As some patients show an intolerance of raw milk, it may be necessary to boil it, at least at first. Some cases will promptly develop headache upon the omission of coffee, and for these cases morning coffee largely diluted with cream may be permitted or caffeine given.

After-treatment. As improvement justifies it, other articles of food may be added to the three regular meals, and these may include soft vegetables and later the white meat of poultry, broiled steak, baked or broiled fish, and raw oysters. One of the principal difficulties, of course, is the matter of sweets.

Patients finally reach that stage of progress where the detailed diet may be discontinued and all restrictions removed except those that are known to be etiological factors in the production of this condition. They are then given written instructions as to what to omit instead of what to take.

Symptomatic Treatment.—All of the unpleasant symptoms usually respond promptly to the plan outlined.

Constipation may be controlled by increasing the magnesium oxide or olive oil or both.

A tendency to diarrhea may be relieved by reducing the olive oil or magnesium oxide or by boiling the milk. Rest is also of advantage.

Nervous irritability is usually sufficiently controlled by the general measures, that are carried out. Bromides may be used to meet the temporary requirements until a better status has been developed.

Headache, when resulting from the hyperacidity, usually subsides promptly when the stomach condition is relieved. For temporary effect, codeine, the bromides, or caffeine, used independently or combined, will meet the requirements.

GASTRIC ULCER

General Statement. Definition.—As the name indicates, this is a condition characterized by the presence of one or more ulcers in the wall of the stomach. The term peptic ulcer is used by many and considered preferable. These lesions may be superficial or deep, acute or chronic, single or multiple. They vary in size from those almost too small to be recognized, to areas so extensive that even in healing cause marked deformity of the stomach and impairment of function through scar formation. An ulcer may be present in any portion of the stomach, but is more common in the posterior wall and the lesser curvature.

Incidence.—No race, class or condition of people is exempt. It is more common in middle life, though it may occur at almost any age. Males are more frequently affected than females.

Etiology.—This is still largely a matter of doubt, though there are certain factors that seem to have etiological importance. Among these are hereditary tendencies, poor health, infectious diseases, foci of infection, alcoholism, drug irritation, dietary indiscretions, mental or physical over-exertion and trophic disturbances. Hyperacidity is found in such a large percentage of these cases, that it should certainly be included as a factor in their production.

Course and Prognosis.—This will depend largely upon the character of the ulcer, as its size and location, the general condition of the patient, and the extent to which cooperation can be secured in the matter of treatment. Some cases call for prompt surgical interference, others must needs be assigned to surgery after medical measures have failed. A large majority of cases respond to medical treatment, but the healing process is slow and the treatment must be long continued. Many cases persist year after year, particularly those where only half-way measures of treatment are carried out.

Symptoms and Diagnosis. General Discussion. There are several avenues of investigation in arriving at a diagnosis of ulcer, these are the history of the case, the physical examination, clinical laboratory, x-ray and therapeutic test. A careful collaboration of all the data obtained by these various processes will usually lead to a definite diagnosis, though some cases will still remain in doubt.

History. This is the most important part of the investigation. An analysis of the data obtained here gives almost unlimited information and it is available to all. The following paragraphs will offer some suggestions along these lines.

Character of Onset. It should be borne in mind that this condition is distinctly chronic, and often a history can be obtained of years of symptoms before medical aid was sought. There is also a distinct tendency to periods of remission or intermission that may last for months or even years.

Gastric Pain and Discomfort. This is one of the most important sources of information, and the following points should be carefully noted:

Character of Pain. That from ulcer is usually described as burning or cutting in character; this is in particular contradistinction to the sense of weight and discomfort of hypoacidity.

Time of Pain. There is usually a distinct relation to the taking of food. Depending upon other factors, such as the location of the ulcer, the pain will be felt anywhere from half an hour to three hours after meals, but in a large percentage of cases, it begins about two hours after the average meal. There is usually a fairly definite history of pain when the stomach is empty, and comfort when the stomach is filled with bland food; this is particularly in contradistinction to the hypoacidity group of gastric disturbances in which there is comfort with an empty stomach and discomfort beginning immediately after meals.

Location of Pain. The usual complaint is of pain in the epigastric region. This may vary somewhat, due to such factors as the location of the ulcer, the position of the stomach, or the presence of adhesions.

What Increases Pain. The patient is usually aware of certain things that cause or increase discomfort, and consciously or unconsciously avoids such items in the diet. These include most acids, such as pickles, vinegar and lemon juice.

What Relieves Pain. Most patients that have suffered for any length of time have learned that sodium bicarbonate will give relief, or they will be found taking cold milk, milk with limewater, or milk of magnesia.

Headache. This is a markedly consistent symptom. It is usually frontal in character, often it takes the form of so-called sick headache; that is, pain associated with marked nausea and vomiting. In many instances there is a definite history of this headache being increased by the taking of acids. It also comes on in most cases during or soon after the period when the gastric symptoms develops, as a few hours after eating, during the night, or is found on awakening in the morning.

Eructation and Regurgitation. There is a distinct tendency toward belching and regurgitation. This material is distinctly acid in character and is usually not food, but gastric juice. It often also causes discomfort in the esophagus; many patients in describing the location of the trouble, will mark out with perfect distinctness the course of that structure and refer to it as a "burning streak." A careful differentiation should be made between the acid character of this regurgitated material, the bitter taste of that containing bile, and the bland more or less unchanged food brought up in cases of hypoacidity.

Emesis. This is not a constant symptom, but is present in a fairly large percentage of cases. It comes on several hours after meals and is usually followed by relief of the gastric discomfort. In most instances the vomitus is noticeably acid in character.

Hemorrhage. While this is not evidenced in many cases, it is one of the symptoms of particular value in establishing a diagnosis. The amount of blood may be large or very small; the hemorrhages may be frequent, or there may be only one during the course of the disease. Blood may be vomited or may pass through the bowels. Particular care should be exercised in differentiating from pulmonary hemorrhage; and the patient can usually be taught to detect the difference between the blood that is truly vomited and that which is coughed up. It is necessary also to differentiate from the blood that has come from the nose or the gums and is sometimes swallowed.

Appetite. This is usually well maintained; in fact, the patient is often conscious of the comfort given by bland foods; or possibly nature in an effort to protect the stomach by the presence of food, maintains a desire to eat. It should be borne in mind that in most of these cases there is over-digestion, which would also contribute to the frequent desire for food. The desire for acid food is usually absent.

Loss of Weight. This is part of the history that will require careful investigation. It should be borne in mind that where there is not very much discomfort or marked impairment of the stomach function, good digestion may result from the large amount of gastric secretion, also these patients may take considerable amounts of food at frequent intervals, particularly milk and cream, to secure relief. Hence many of them are found to be in a high state of nutrition. Where loss of weight is taking place investigation should be made as to whether or not there has been voluntary starvation. One of the symptoms of the hyperacidity group is a tendendy to maintain weight, as in the hypoacidity group there is a tendency to lose weight.

Constipation. This may be present, though it is not a constant finding. Some patients show hyperactivity of the intestines.

Nervous Phenomena. There is a distinct tendency to nervousness, restlessness, insomnia, and lowered mental efficiency. This is partly due to the frequent discomfort to which these patients are subjected.

Physical Examination. This should include a careful investigation of the general condition of the patient, particularly to establish the presence or absence of other diseases. The comparative state of nutrition should be investigated, as mentioned in previous paragraphs. There is usually tenderness in the epigastric region, the exact location may be influenced by the location of the ulcer or the position of the stomach. As previously stated, there may also be tenderness in the region of the ninth and tenth dorsal vertebræ.

Laboratory. Gastric Contents. A careful investigation of this source of information is invaluable in establishing a diagnosis. There is usually a hyperacidity, though failure to find an increase in the acid content will not exclude ulcer; there may or may not be blood. Examination should be made of the gastric contents after a test-meal and of the material obtained by fractional removal. The estimate of the gastric function should be based upon all the data obtained by these various examinations.

Blood. The blood will show nothing abnormal, unless there is anemia resulting from hemorrhage.

Urine. This gives no definite information.

Feces. This may give information of value in a differential diagnosis, particularly from the standpoint of gall bladder disease. It should also be examined for the presence of occult blood indicating hemorrhage.

X-ray. Every suspicious case should be given the benefit of a thorough *x*-ray examination. While a negative report does not eliminate the presence of ulcer this investigation gives information of value in a sufficiently large percentage of cases to recommend its routine use.

String Test. This measure is one of the many that may be useful in selected cases.

Therapeutic Test. Sometimes the administration of hydrochloric acid will cause an increase in discomfort while the simple measures for the correction of hyperacidity will give relief.

Differential Diagnosis.—There are many conditions that may have to be eliminated but only a few of the most common of these will be suggested here.

The Hypoacidity Group. The differential diagnosis here has been largely suggested in the preceding paragraph. These cases are apt to show discomfort instead of pain, the discomfort coming on promptly after eating and subsiding after the stomach has emptied. Ulcer cases tend to have comfort after eating and the pain begins again as the stomach is emptied. If there is regurgitation in the hypoacid group, it is either neutral or bitter. In the hyperacid group, it is acid and burning.

Simple Hyperchlorhydria. This is extremely hard to differentiate from ulcer and at times impossible, particularly as the same measures of treatment give relief. The differentiation depends largely upon the fact that ulcer is more apt to give hemorrhage and the symptoms are more severe. The *x*-ray and string test may complete the evidence necessary for a diagnosis.

Duodenal Ulcer. This may at times be impossible to differentiate. Among the findings of importance are that there is a greater tendency for the pain to be to the right; there is less tendency to the vomiting of blood, and more to occult blood in the feces; the taking of alkalies does not seem to give the same prompt relief. The *x*-ray will often establish a diagnosis. These matters will be discussed more in detail under the head of duodenal ulcer.

Carcinoma of the Stomach. In this condition the tendency is to continual pain and greater tenderness. There is not the relief from taking food, but rather a tendency to increased discomfort. There is usually hypoacidity instead of hyperacidity of the stomach contents. Other laboratory findings may give information of value. A mass may often be demonstrated on palpation. The *x*-ray is invaluable in establishing a diagnosis here.

Gall-bladder Disease. It should be borne in mind that this is often associated with gastric ulcer. There is an absence of gastric hemorrhage, the pain is usually to the right of the median line and the tenderness is rather in the right hypochondrium than in the epigastric region. The referred pain in gall-bladder disease is to the scapula region and shoulder of the right side. There is not the prompt relief from taking alkalies and bland foods. The pain is more apt to come on, particularly with gall-stones, considerably later than is the case of ulcer. There is a tendency to imperfect digestion of fats and there is not the characteristic hyperacidity. There is often fever. A diagnosis may usually be reached from a proper evaluation of these and other data obtained by a careful and thorough investigation.

Prophylaxis.—The prophylaxis of gastric ulcer would include the regulation of a large part of our manner of living. Among the special considerations that should be borne in mind are proper attention to the teeth and tonsils, or other foci of infection anywhere in the body; careful eating and the avoidance of alcoholics and of highly seasoned and very hot foods. Attention to disease processes, such as chlorosis and chronic appendicitis and prompt and thorough treatment of simple hyperacidity are important.

Treatment. General Considerations. Most medical writers in discussing the treatment of gastric ulcer outline elaborate routines, such as that of Sippy. All of these are excellent, and, if they were uniformly applicable, there would be little need for further literature on this subject until our present knowledge had been increased. There are unfortunately, however, several considerations that must be taken into account. In the first place, such a plan must include a degree of concentrated treatment that is not available in many private homes or even in some of our large hospitals unless special nurses are provided. Again, a great many patients are simply not able to afford the time or to meet the financial demands necessary. Then there are many who would not submit themselves to such discipline unless forced by suffering, hemorrhage, or other evident necessity. This is usually not realized by the specialist in gastro-enterology as the patients who come to him are those who either feel the urge of necessity or who have gone the rounds of less effective treatment, and seek the specialist as a last resort. A large part of the profession are so situated that they are without the proper facilities for carrying out some of the details, such as frequent laboratory examinations, gastric lavages, and duodenal feedings. It is well to recognize the fact that a large proportion of the cases of gastric ulcer must be treated in the home by the general practitioner without even the help of a trained nurse. It is especially for the benefit of this group of physicians that this article is intended.

There are always certain conditions that must influence the plan of treatment. These are the state of nutrition of the patient; whether or not there is hemorrhage; the degree of suffering; and whether the ulcer is acute or chronic.

One of the main considerations is the extent to which the desired measures can be carried out. This would include such factors as:

Can the patient go to an institution; if so can he employ special nurses?

If the patient is treated in the home, can he afford trained nurses?

Can the patient spend sufficient time in bed and in convalescing?

Will the patient and family co-operate?

Is the case urgent or disabling, or are the manifestations sufficiently marked to demand a period of intensive treatment?

These and many other questions must be considered in making plans for the management of these cases.

General Measures.—No matter what plan of treatment is followed, there are certain general measures that are either necessary or highly desirable and apply fairly well to all cases. Among these are careful attention to the mouth, particularly the teeth and tonsils should any trouble be found. In any event, the most thorough oral hygiene must be employed throughout the course of the treatment and the patient impressed with its importance for after-life. Tobacco and alcoholics should be excluded.

Rest. In all cases, as previously suggested, it is highly desirable to have the patient, at least for the first few weeks, at absolute rest. In some cases, as, for example, where there is hemorrhage, absolute rest is essential. While rest is always desirable, almost any internist of experience can recall many instances where patients have continued to complete recovery without losing a day from their usual vocations. In this, as in most other phases of medicine, we have to be guided by the necessities of the situation. The rest should be mental as well as physical. The bed patient here, as always, should be made as comfortable as possible. The room should be free from noises, and particularly free from odors from the kitchen. It should be well ventilated, properly heated, if necessary, and all the arrangements pleasing and cheerful.

The usual attention should be given to the body; this includes a daily cleansing bath. Applications to the abdomen will be discussed under the heads of treatment of hemorrhage and treatment of pain. These are more than palliative measures, as they probably have direct curative value. It might also be mentioned here that restriction of sodium chloride should be maintained in all cases.

Symptomatic Treatment.—No matter what curative treatment is instituted, there are certain symptomatic measures that will apply.

Hemorrhage. This calls for absolute rest and it is particularly desirable that the patient be made as comfortable as possible, as this lends itself to quiet and sleep. If the patient is excited, as is usually the case, a hypodermic of morphine, about ¼ grain (0.015 Gm.), is indicated; in fact, unless there is some contra-indication this should be used as a routine measure in severe hemorrhage. It is usually best to give with this about 1/100 grain (0.0006 Gm.) of atrophine sulphate. An ice bag should be applied to the epigastric region; for the average patient, it is best to use the 9 inch bag so as to cover sufficient area. It should not be filled too full, as it is desirable to have the bag spread out wide and not be too heavy. The skin should be protected by about two thicknesses of soft face towel. Nothing should be given by mouth. The patient should not be allowed to chew gum or do anything that would stimulate the flow of saliva. Liquids should be given by rectum, preferably by the Murphy drip, but sometimes retention enemas can be used to advantage. By the Murphy drip there may be given about four pints every twenty four hours, this can include about 6 per cent of glucose. If it is necessary to give other medication, such as sodium bromide or alkalies, they may be added to this fluid. The typical nutrient enemas may be tried, though the necessity for them is not often present and the value is rather questionable. In using the retention enemas, about 6 fluid ounces (180 cc.) may be slowly injected every three or four hours, depending upon the tolerance of the patient. The Murphy drip is more uniformly satisfactory.

In cases of severe hemorrhage that persist or that sufficiently reduces the blood content, prompt transfusion is indicated. Where the proper facilities are available, this is certainly a measure of choice. Other remedies are used, such as the injection of horse serum, the use of adrenalin by mouth, the calcium salts and various proprietary preparations. The value of these is somewhat uncertain.

Following the subsidence of hemorrhage, feeding should be resumed very carefully. A plan that seems to be of value is to begin with ½ fluid ounce (15 cc.) of limewater and 1½ fluid ounces (45 cc.) of cold milk. At this time water in small amounts may also be given.

Pain. This is usually entirely controlled by the diet and medication that forms a part of the general plan of treatment. If a hypodermic is used, as suggested, in case of hemorrhage, this will meet the immediate requirements for relief of discomfort. Should medication be necessary, codeine may be given by needle and is probably the most satisfactory agent for relief. In the case of hemorrhage, an ice bag is used as previously directed, and this contributes to relief of pain. If there is no appreciable hemorrhage, hot applications to the abdomen not only contribute largely to the relief of discomfort, but probably have direct curative value. They are used in the form of hot fomentations, or the electric pad or both. Care should be exercised to avoid injuring the skin. This may usually be effected by the proper regulation of the degree of heat, and by the use of bland ointments, as cold cream. The compress should be of sufficient size to cover the entire abdomen, and is wrung out of plain hot water or hot water to which oil of turpentine has been added. It is either changed with sufficient frequency to keep it warm or it is kept warm by placing over it the electric pad, or some other device for this purpose. It should be used more or less continuously, being guided by the condition of the skin. This may be continued for one or more weeks.

Nervous Phenomena. The general plan of treatment, that is the rest and comfort, proper diet and general medication, will usually meet all the requirements. Where special medication is necessary, sodium bromide in 15 to 30 grain (1 to 2 Gm.) doses may be used.

Nausea. Here also the general plan of treatment, as starvation or careful diet, rest and comfort, and local applications will usually meet all requirements. Where they do not, sodium bromide may be given in 30 grain (2 Gm.) doses by enema.

Constipation. The magnesium oxide which is one of the main agents in medication usually meets the requirements here; in fact, this often has to be restricted on account of its laxative effect. Olive oil also forms a part of the general medication and this may be given in sufficient amounts to meet the requirements of intestinal elimination. Simple enemas may be used when necessary.

Special Treatment.—It is not intended that the following plan of treatment should replace the excellent one outlined by Sippy when the proper facilities are available and the patient will lend himself to the more strenuous measures. I have, however, found this plan of considerable advantage and believe that I have been justified in many cases where the conditions were not urgent in at least giving it a reasonable tryout, and it has usually met the requirements.

Where possible the patient is placed at rest and all of the details outlined under general measures are carefully carried out. If there is hemorrhage or marked pain, the patient is given the treatment just as outlined in the preceding paragraphs. Where it is possible, the progress of the case is checked up by gastric analysis, though in many cases it is not practicable to do this to the extent that is often recommended. The symptoms will give a fairly good clue as to results that are being obtained.

The patient is given the following written instructions, in addition to any special instructions as to rest, etc., that may be necessary.

A glass of milk every hour or two when awake.
Water as wanted.
1 tablespoonful of olive oil at bedtime.
A glass of hot water early each morning.
A powder in water three times a day between feedings.
Nothing else to eat or drink.

This is kept up from three to seven days, depending upon the condition of the patient and his reaction to treatment from the standpoint of the relief of pain and hunger. The following set of instructions is then given in addition to any special requirements that may be necessary:

Eat three meals a day, consisting of foods selected from the following list.

Two hours after meals take a powder in water followed by a glass of milk.

Continue the olive oil at bedtime and the hot water in the morning.

Diet. Water, milk, cream, milk shakes, strained milk soups, gelatin (with cream), toasted soda crackers, butter.

The patient is given written instructions to prepare the milk shake according to the following formula:

One whole fresh egg, one heaping tablespoonful malted milk, ice, milk (or half milk and half cream) to fill the shaker. Not over six or eight ounces of this is to be taken at first, and the amount may be gradually increased.

The milk soups are to be prepared by using one-half milk, a sufficient amount of rice or barley, and only enough other material as celery, peas, potatoes, or asparagus to flavor. This is strained before serving. The use of salt is restricted, condiments are excluded, and sugar practically so.

After a few days or weeks of this diet, such articles of food are added as well cooked grits, cornmeal mush, cream of wheat, soft boiled eggs, toast, malted milk, and creamed potatoes. The diet is later increased by such articles as soft cooked rice, creamed carrots and Spanish cream. We must realize that on a diet as given above, most patients can live in comparative comfort for a considerable time, and it is probable that the main error is in increasing the diet too rapidly.

As the weeks progress, the patient is allowed raw oysters, poached eggs, plain breads, the white meat of poultry, and gradually brought around to a diet that, instead of being given in detail, is only curtailed by definite restrictions and the patient should submit to some restrictions for a number of years. This list of excluded foods includes such articles as pickles, vinegar, highly seasoned foods, alcoholics, and what might be called foolish foods, as courtboullion, hot tamales, and "hot dog" sandwiches. It is advisable to make a careful inquiry into the tastes of the patient and to exclude all things that might be harmful. A good plan is to have the patient during convalescence submit a list of foods desired, this list to be checked up by the medical attendant, and such articles selected as are advisable.

Medication. The powder mentioned in a preceding paragraph may be ordered as follows:

℞		or
Atropinæ Sulph.,	gr. 1/10	0|006
Bism. Subnit.,		
Magnesii Oxidi,		
Calcii. Carb. Præc.,		
Sodii Bicarb.,	āā ʒiv	15|000
M. ft. cht. no. xx		
Sig.—One powder three times a day.		

After this has been taken about two or three weeks, depending upon the progress of the case, the dose may be reduced to one-half powder, then one-third, or the prescription may be written as follows:

℞		or
Atropinæ Sulph.,	gr. 1/10	0.006
Bism. Subnit.,		
Magnesii Oxidi,		
Calcii Carb. Præc.,		
Sodii Bicarb.,	āā ʒiv	15.000

M.
Sig.—Level teaspoonful in water three times daily.

On the back of the prescription the druggist should be instructed, "Put in a wide-mouth bottle."

The amount can then be changed by instructing the patient to take one-half or one-third level teaspoonful, as may be indicated.

This treatment should be continued for many months, depending upon the progress of the case as shown by careful observation and investigation. Even when the powder is discontinued, the milk, or milk and cream, two hours after meals, should be persisted in. It is desirable that food should not be taken too hot, and iced or frozen foods should also be avoided.

Sippy Treatment. Where this can be carried out it is probably the best plan that has yet been suggested for the relief of peptic ulcer. It is not my intention here to give a complete detailed discussion of this treatment, but only an outline, as it is so elaborate, that the excellent writings of this eminent internist should be studied in detail. His treatment depends largely upon the fact that hyperacidity has much to do with at least perpetuating the ulcerated condition, and that when this is relieved and kept so, the case usually progresses to cure. This control of hyperacidity is checked up by frequent gastric analyses. He recommended that where practicable the stomach contents be removed for investigation on two afternoons and three evenings of each week during the first three or four weeks of treatment. The physician being guided in this largely by the progress of the case. The medication consists largely of two formulas for powders, one of which contains 10 grains (0.6 Gm.) of magnesium oxide (heavy) and 10 grains (0.6 Gm.) of sodium bicarbonate, the other containing 10 grains (0.6 Gm.) of precipitated calcium carbonate and 30 grains (2 Gm.) of sodium bicarbonate; these powders to be alternated, one every hour from 7:30 A.M. to 7:30 P.M. They are given halfway between the hourly feedings. After the 7 P.M. feeding, a powder is given not only at 7:30, but every half hour for four or five doses. In case the magnesium oxide powder produces too much laxative effect, the other powder is substituted for it in a sufficient number of doses to meet the requirements. These powders are used throughout the course of treatment. In the beginning of treatment there is given every hour, from 7 A.M. to 7 P.M., 3 fluid ounces (90 cc.) of milk or milk and cream in equal parts. After two days of this, there is added to one forenoon feeding and one afternoon feeding some light nourishment, as a soft boiled egg and cracker, a slice of bread and butter, or a well cooked cereal, as rice, oatmeal, or farina, this not to exceed three ounces, measured when ready to serve. It will be understood that these are added to and given at the same time as the regular three ounces of milk, or milk and cream. These feedings in addition to the milk and cream are gradually increased until at the end of the first week the patient is taking three ounces of milk, or milk and cream, every hour, and two or three soft boiled eggs (one at a time) and from six to nine ounces of cereal (three ounces at a feeding) daily. The cereal and egg are given alternately.

After a week of such a diet, there are gradually added such articles as custard, cream soups, vegetable purees, and other soft, palatable foods. These may at times be substituted for the regular milk and cream feedings. The food requirements with regard to amount should be checked up by frequent weighings of the patient. In the beginning of the fourth week, the routine is changed to three small meals daily in place of the usual milk, or milk and cream, feedings at those times; that is, the patient is now given three meals, and the milk and cream between. These meals are not to exceed ten or fifteen ounces (measured after being prepared for serving), and are to consist of such foods as previously mentioned (soft boiled eggs, soft vegetables, etc.) and cooked fruits and simple desserts. After a few weeks raw fruits may be allowed. When the patient is taking three rather substantial meals a day, the plan is to give a powder every half-hour for two or three doses after breakfast and after the noon dinner. After the evening meal, which should be light, the patient is given a powder every half hour for four or five doses. This treatment is to be carried out as thoroughly as possible for one year. During the progress of the case, the patient may be allowed to take a full meal occasionally, followed by five or six doses of the powder at one-half hour intervals. Later on it is recommended that the powders be stopped for five days at a time, and then resumed for five or six weeks. It is also recommended that the patient during the period of intensive treatment be educated in the idea and general plan of treatment so that he can carry it out to better advantage.

A very important part of the treatment is the aspiration of the stomach contents, particularly where there is pyloric obstruction. Should obstruction be found it is recommended that the gastric contents be removed at 9:30 P.M. and at midnight, this to be kept up until the findings become such as to justify its discontinuance; that is, until the amount of acid material be reduced to a neglible amount at midnight treatment.

Other Treatment. The special plans of treatment as outlined by such clinicians as Barker, von Leube, Lenhartz, Einhorn, and others present many excellent points. I have had no personal experience with these systems, and will not attempt to outline them.

Special Drugs. The drugs in common use have been mentioned in the preceding paragraphs. Special mention might be made of the following:

Bismuth. This has been discussed under the head of special treatment. Some clinicians prefer the bismuth subcarbonate to the subnitrate, claiming that it is more efficacious due to the character of its minute structure. It is given in the same quantity as the subnitrate.

Belladonna. Atropine was mentioned in the special treatment; the tincture of belladonna in proper amount may be substituted in the prescriptions given. Some give it in small doses of five to ten minims, others give it in increasing doses until the toxic effect is evidenced; that is, the dryness of the mouth, flushing of the face, and dilation of the pupils.

Magnesium Oxide. It might be mentioned here that the combining power of magnesium oxide with hydrochloric acid is several times that of sodium bicarbonate; it also has the additional advantage of not giving off carbon dioxide, therefore, will not liberate gas in the stomach in the chemical reaction of neutralizing acid. Its laxative qualities may interfere with its use in the quantities desired.

Cerium oxalate, kaolin, and many other somewhat related products, have been used. Silver nitrate has been somewhat extensively employed here, being given in the coated pills or used as a gastric lavage, but caution should be exercised to prevent argyria.

Surgery. A certain portion of cases of gastric ulcer require operation. Among these are:

Acute disaster, such as perforation.

Failure to respond to medical treatment.

Those cases that cannot or will not cooperate in medical treatment.

Complications.—The principal complication is perforation. This may be either acute, in which the gastric contents are allowed to reach the peritoneal cavity, or chronic, in which case the peritoneal cavity may be protected by adhesions, or other safety measures of nature. Both of these conditions call for surgical interference.

Hemorrhage has been discussed in preceeding paragraphs.

DUODENAL ULCER

General Statement. Definition.—This is a condition characterized by ulceration of the wall of the duodenum. There is usually only one ulcer, though there may be more. In the vast majority of cases the lesion is situated in the first portion of the duodenum.

Incidence.—This is very much the same as gastric ulcer, with the exception that the condition is more frequent in men. It is also more common in childhood than the gastric type.

Etiology.—The etiological factors discussed under the head of gastric ulcer will apply here also. Duodenal ulcer is frequently found following burns or associated with gall-bladder disease, in the latter case due to more intimate relation to that viscus and its discharges.

Course and Prognosis.—Duodenal ulcer shows a greater tendency than does gastric ulcer to run a mild course; it is less damaging in its healing process, and there is less tendency to malignant degeneration.

Symptoms and Diagnosis.—Practically all of the symptoms and diagnostic points given under the head of gastric ulcer (see page 461) will apply here. The facts of particular interest are those that tend to characterize the condition as being duodenal in contradistinction to gastric. As previously stated, the course of the disease is usually more benign, the processes resulting in less damage, and with much less tendency to malignant change. There is probably less pain, though it has been claimed that the so-called hunger pain is more pronounced in this particular type of lesion. The pain has a tendency to come on later after eating than is the case with gastric ulcer, instead of from one to two hours, the most common time is from two to four hours after meals. There is a greater tendency for the pain to be referred to the right of the median line than in the gastric lesion; this applies also to tenderness, though, of course, there may be marked exceptions. The pain is not so quickly relieved by the administration of alkalies or bland food. There is much less tendency to vomiting in duodenal ulcer and, when vomiting does occur, there is less apt to be hematemesis. The hemorrhage is usually manifested by the evidence in the feces. It should be borne in mind that probably in five or more per cent of the cases both the stomach and duodenum are involved. There may be jaundice in this condition, though it is not by any means a common finding.

Laboratory. With duodenal ulcer there is a tendency to higher and more constant hyperacidity, and, as a rule, the absence of blood. The string test will show the blood stain nearer to and in closer relation with the bile stained section.

X-ray. The x-ray may give valuable information.

Prophylaxis.—See gastric ulcer (page 465).

Treatment.—The treatment is practically that of gastric ulcer (see page 465). It is probable that the x-ray has been more used in this condition than in the gastric type of lesion.

CARCINOMA OF THE STOMACH

General Statement.—This condition is usually primary, but it may be a secondary involvement from a malignant process elsewhere in the body. The usual sites are the lesser curvature and the pylorus. Various types are recognized, but a discussion of these more properly belongs to the field of pathology.

Incidence.—This condition is more commonly found in the fifth and sixth decades, though it may occur later in life. The incidence gradually diminishes before the fifth decade. It is rare before thirty years of age and very unusual in children. No race is immune and it is found also among all classes and conditions of people. It seems to be more common among the well-to-do.

Etiology.—The cause of cancer of the stomach, or elsewhere, is still shrouded largely in mystery. Some factors that seem of importance are heredity, gastric ulcer, oral sepsis, achylia gastrica, bacterial activity, and prolonged irritation (as by nicotine or highly seasoned food).

Course and Prognosis.—These depend particularly upon the location and type of the growth, and upon such complicating factors as metastasis, hemorrhage, and perforation. The most important element in the outlook is the establishment of an early diagnosis and a prompt resort to surgery. From the surgical standpoint the prognosis will depend upon such factors as the degree of involvement found and the completeness with which the diseased area may be removed. In non-operative cases, it may be said in a general way that the course is from three months to two years.

Symptoms and Diagnosis. General Considerations. There are several possibilities that may influence the evidence of this condition. When carcinoma and ulcer are both present, the symptoms of the malignant process may be largely overshadowed by the more marked symptoms resulting from ulcer. Another consideration that must always be borne in mind is the possibility of the gastric lesion being secondary to one elsewhere in the body. Again, when the gastric condition is primary and has persisted for some time, the symptoms may be influenced by metastatic developments from this focus. It has been well stated that during the so-called cancer period of life (fifth and sixth decades) persistent gastric symptoms should lead one at least to consider a possibility of malignancy and to make an investigation to confirm or exclude this diagnosis.

In a general way it may be said that many of the symptoms may be grouped under two heads—those resulting from motor impairment and those from disturbance of the secretory function. Such impairment always takes place and the results of obstruction give rise to much of the discomfort experienced by the patient.

History. In establishing a diagnosis, the history is of much importance particularly from the standpoint of symptoms that would indicate a pre-existent ulcer; this may date back for years.

Onset. The onset is usually slow, the patient beginning with vague discomfort that is usually attributed to "nervous indigestion," or may be classed by the family as neurasthenia. In some instances the disease may progress to a considerable extent before any discomfort is felt by the patient and suddenly, almost without warning, symptoms of the most urgent kind may be evidenced.

Digestive Symptoms. These are always present sooner or later; often they will be the first evidences of the disease. Among these are anorexia, pronounced aversion to meat, belching, and gaseous distention. The tongue is usually coated and the breath may be distinctly foul; many have claimed the odor to be characteristic.

Pain and Discomfort. While the pain may be severe, it is usually of a dull, aching character. It is referred particularly to the epigastric region, but the exact location depends to some extent upon the location of the growth and the position of the stomach. The patient at first usually complains of a sense of weight, of a dull discomfort in contradistinction to the sharp pain of ulcer. Tenderness is usually present in the region of the tumor. The discomfort is usually increased by the taking of food, particularly if the food is of a rough character.

A characteristic of the symptoms is their continuous character; there is little relief by the taking of food or the use of medication. There is little tendency to remissions or intermissions, the patient usually complaining of a persistent day after day and night after night discomfort.

Regurgitation. Most cases are sooner or later troubled with regurgitation; the material as a rule is sour, or even distinctly foul, in taste and odor.

Emesis. This is quite common, and where there is obstruction, large quantities of material may be brought up, often containing blood, particularly of the "coffee grounds" type. Depending upon the condition of the stomach, the material may be more or less unchanged or it may be sour or fetid in character.

Hemorrhage. This always sooner or later occurs. There may be frank hemorrhage, where large amounts of blood may be brought up by emesis or pass from the bowel; or there may be small amounts only at infrequent intervals, as evidenced by careful and repeated examinations of the feces.

Nervous Phenomena. There are no nervous phenomena characteristic of this condition. There is naturally a tendency to depression and lowered mental efficiency. There may be insomnia, irritability, and various other manifestations. As in most gastric diseases, there is a tendency to mental depression.

State of Nutrition. The weight of the patient may be maintained for a considerable time, but the tendency is for a fairly early impairment which later reaches a marked degree of emaciation and physical weakness.

Anemia. This is always sooner or later in evidence; and it may reach an extreme grade of the secondary type. Late in the disease cachexia is evident also.

Constipation and Diarrhea. There may be constipation, occasionally diarrhea or there may be alternate periods of each.

Toxemia. This is usually evident, particularly in the later stages.

Tumor Mass. Sooner or later it is almost always possible to make out a tumor mass. Unfortunately, this is a late evidence and by the time a palpable tumor is found the disease has reached a hopeless stage.

Enlarged Glands. There may be appreciable enlargement of the related lymphatic glands, though this also is apt to be a late manifestation of the disease. The first affected, as a rule, are those in the region of the left clavicle. There may be enlargement of the liver.

Edema. This occurs in the majority of cases, beginning in the lower extremities. Ascites develops as a late symptom.

Laboratory. There is nothing characteristic in the urine. The most valuable evidence is obtained by examination of the feces for the presence of blood. The gastric juice gives important information. In a general way it may be said that there is a marked tendency to diminished hydrochloric acid or even achylia gastrica. There is usually blood and excessive mucus. Investigation should also be made for lactic acid and Boas-Oppler bacilli. The string test mentioned in the discussion of gastric ulcer is also of value in establishing the presence of a bleeding surface.

X-ray. The *x*-ray often gives information of great value. No examination is complete without this procedure. The *x*-ray evidence should not be taken as final either for or against carcinoma, but constitutes a valuable part of our information, the sum total of which establishes a correct diagnosis.

Differential Diagnosis.—Many conditions may have to be considered, but they will be discussed particularly under their respective heads (gastric ulcer, hyperchlorhydria and hypochlorhydria).

Prophylaxis.—As the cause of cancer is still largely shrouded in mystery, little definite can be suggested in the way of prophylaxis. Proper attention to gastric disturbances, particularly ulcer, would seem of importance and proper diet and oral hygiene even in times of perfect health.

Treatment.—The only curative measure is excision. The value of surgery depends largely upon the case being brought to operation sufficiently early to permit of a thorough removal of the diseased area. This would, of course, mean before any metastatic processes had taken place. It is largely for this reason that an early diagnosis is imperative. If the diagnostician waits until definite evidence of tumor mass can be established, it is usually too late for any procedure to avail. In case of doubt, an exploratory incision should certainly be made.

Medical Treatment.—This applies to those cases that are nonoperative.

General Care.—It should be borne in mind that these patients may live for many months and, though a cure is not possible, much may be done to promote comfort. It is usually not advisable to inform the patient of his condition, but some responsible member of the family should certainly be well acquainted with the diagnosis and prognosis.

The whole plan of management is directed toward relieving pain and making pleasant the short time that remains to the unfortunate victim. If the general physical condition is fairly good, activity need not be materially restricted, the amount of liberty depending both upon the physical and mental condition of the individual and his reaction to exercise. Every effort should be made to secure the proper amount of rest and sleep, to conserve the body's resources, and to promote cheerfulness. If the patient is bedridden, attention should be given to such matters as a comfortable bed, body cleanliness and those other factors that must be considered in any serious sickness. The mouth must receive particular care, though no extensive dental work should be attempted, the idea being rather to promote comfort and favor the proper handling of food.

Gastric Lavage. This is extensively employed by some. Its use should probably be confined to those cases in which it is indicated by retention, or in which it seems to give actual relief from discomfort. It is contra-indicated in hemorrhage. It is certainly a measure that may be fraught with risk, and in many cases the discomfort of the procedure will not be justified by the relief given.

Diet. Individualization is necessary. There is no reason to restrict any food that the patient seems able to handle. As a rule, it is better to confine the diet largely to soft foods that are easily digested and highly nutritious. Among these are milk, plain or in the form of milk soups and milk shakes, gelatin, custard, soft-boiled eggs, well-cooked cereals, mashed potatoes and other soft vegetables, toast and butter. If there are no contra-indications, the patient may take such meats as poultry, broiled steak, and baked or broiled fish. It is better to give frequent small feedings. Late in the disease it is often impossible for the patient to retain much taken by mouth, when he may be tided over a short period by rectal administration. This applies particularly to water, as the amount of nutrition that can be given this way is very small.

Symptomatic Treatment.—Many symptoms arise calling for special attention; among these the most common are gastric **pain** and **discomfort.** Rest and proper diet will do much towards preventing or relieving these. Alkalies are often given and may be of distinct advantage. Hot fomentations at times give a certain measure of relief. The various local anesthetics may be tried by mouth, and at times prove of value. The tincture of opium has been extensively used in 5 to 10 minim (0.3 to 0.6 cc.) doses. It should be remembered that we owe it to these unfortunates to give them as much relief from suffering as we can, therefore the use of codeine or morphine is sooner or later indicated in most cases, and should be resorted to when necessary and in whatever amount may be required to produce reasonable relief. Where there is much retention, or nausea, pain-relieving medication will have to be administered by hypodermic, or in suppositories.

Nausea. This may be relieved largely by rest, proper diet, and other measures of general care. Bromides in sufficient dosage will be of assistance. The proper use of alkalies or hydrochloric acid, as indicated, are often of value. Local anaesthetics may aid in controlling this symptom. It is here that gastric lavage may be particularly indicated.

Anorexia. Anorexia may be combatted by the various measures of general care such as rest, fresh air, and proper diet. Attractive surroundings and daintily served meals are always of advantage. The simple bitter tonics such as elixir of iron, quinine and strychnine, or the compound glycerophosphates may be tried.

Constipation. This may be influenced by the diet and, where not contra-indicated, by the proper amount of physical activity. Among the medicinal agents, olive oil or liquid petrolatum are of most advantage.

Anemia. This is influenced by the proper employment of iron and arsenic, in any of the common forms. One of the most satisfactory preparations is the solution of iron and ammonium acetate. Arsenic may be added to this in the form of Fowler's solution.

Many prefer to give the iron and arsenic by needle, using sodium cacodylate and iron citrate, or the iron arsenate. It would seem preferable not to add to the discomfort of the patient by hypodermic medication unless particularly indicated.

Nervous Phenomena. These may be controlled as the same condition arising from other causes. For sleeplessness and restlessness the bromides, barbital, luminal, or other agents may be used in sufficient amounts to meet the requirements. The tendency to melancholia must be combatted by cheerful surroundings, mental diversion, and recreation within the ability of the patient.

Hemorrhage. This is to be treated like gastric hemorrhage occurring from other causes. If extensive it would call for absolute rest, the withholding of all food by mouth, the application of the ice bag, and possibly a hypodermic of morphine. Various other measures mentioned under the head of hemorrhage in gastric ulcer may be employed, such as adrenalin or calcium lactate by mouth, or intravenous therapy.

Complications.—The principal complications are hemorrhage, perforation, and metastasis. The management of hemorrhage has already been discussed; there is nothing to be done to prevent metastasis except early excision; the management of perforation is surgical.

CONSTIPATION

General Statement. Definition and Discussion.—This is a condition characterized by deficient elimination from the intestinal tract. It may be primary or a complication of some other disease process. Several types or subdivisions are recognized, but for convenience of study the condition will be discussed here as a whole.

It is difficult to make a definite statement as to the effects of this condition. There are some who complain of headache or other discomfort, if they even miss their regular time of emptying the intestinal tract, and others who apparently experience no inconvenience even from pronounced constipation.

The largest and strongest child that I ever saw at six months of age had never had an intestinal evacuation except by the use of enemas. I know one person, apparently in perfect health, who seldom empties the bowel more than once a week.

There is no doubt, however, that regular, systematic habit in the matter of daily intestinal elimination is decidedly a factor in the maintenance of perfect health.

Constipation not only may cause trouble because of the mechanical presence of a fecal mass in the bowels but also through the absorption of toxic material and the interference with proper digestion and assimilation.

Incidence.—It may affect any age or condition of humanity. It is more common in the early and late years of life. It is decidedly more frequent among females, also among brain workers or those leading a sedentary life, than among those engaged in manual labor.

Etiology.—The causes of constipation are too numerous to be discussed in their entirety, but a few are worthy of particular note.

Habit. We are largely creatures of habit and there are few faults acquired more easily than irregular intestinal elimination. There seems to be an erroneous idea, very common among the laity, that the intestines should be emptied only when the demand is felt; and, in this way, a perfectly normal individual may soon acquire any degree of constipation.

It is very often the case with school children, particularly girls, that through false modesty they unintentionally acquire the habit of constipation; and this can be combatted only by giving them the proper viewpoint or by the parents' exercising sufficient care in the matter before the child leaves home. This applies also to office employees, particularly women.

Sometimes business men find it inconvenient to meet the requirements of nature or the fault is acquired through sheer neglect, laziness, or indifference.

Diet. Food may be of such type as to favor the development of constipation. On the other hand, as will be discussed later, food is to be used as the sheet-anchor of treatment.

Enteroptosis. A certain degree of enteroptosis is very common and often a marked degree does not seem to interfere with intestinal elimination, but it is a fact that the condition easily lends itself to the development of constipation.

Muscular Insufficiency. 1st. Abdominal Muscles. An improper development or relaxed state of the abdominal muscles may interfere with intestinal elimination by superinducing enteroptosis or by failing to give the necessary assistance in the mechanical act of elimination. We find this particularly true of women who have borne children. The treatment of this will be considered under the head of Exercise.

2nd. Intestinal Muscles. Imperfectly functioning intestinal muscles naturally militate against proper elimination. It is fairly common to find patients in whom there has been so much dilation in the lower intestine, due to prolonged constipation or enemas, that a type of constipation has resulted that is very difficult to treat.

Insufficient Fluids. This may be a factor due to the limited intake, from over-absorption from the digestive tract, or from over-elimination through the urinary system and skin. A certain amount of moisture is necessary for proper intestinal elimination.

This type of trouble lends itself particularly to acute or chronic impaction.

Mechanical Obstruction. Occasionally cases are encountered in which there are bands of adhesion, strictures, or new growths that mechanically interfere with the process of elimination.

Treatment.—The treatment can be divided into two heads:

First. The temporary treatment to give the patient relief until other measures can become sufficiently effective. This is largely medicinal.

Second. Those measures that are directed against the cause of the trouble and tend to the formation of a regular habit. In this, medicine is entirely secondary, if used at all.

Taking the treatment as a whole, it is probably better discussed under the heads of Hygienic and Mechanical, Dietetic, and Medicinal.

Hygienic and Mechanical.—This is by far the most important part of the treatment.

Habit. As previously stated, this is the principal cause in the production of constipation. Habit can also be made the principal factor in relief of the condition. The statement has been made that anyone who will try patiently to empty the intestines every morning for one hundred mornings, will establish a proper habit that will be maintained until it is interfered with by neglect.

There is still some discussion as to whether it is better to acquire the habit of intestinal elimination when first arising in the morning, or to wait until after breakfast. In any event it is desirable to have one definite time which is maintained. Either of these periods suggested seem to meet the requirements and usually it can be left to the convenience of the individual.

This function is so important that nothing should be allowed to interfere with it, and the unfortunate tendency to hurry should be avoided absolutely. Only by the use of sufficient time can elimination be sufficiently complete to meet the requirements.

Exercise. Almost any type of exercise seems to be beneficial. It is well-known that exercise of some of the muscles of the body tends to develop the others not directly involved. In other words, the exercise of part of the body tends to develop the body as a whole.

There are certain exercises, however, that lend themselves particularly to the prevention and relief of constipation. The most important are those that tend to develope the abdominal muscles. My rule has been to have the patient take, night and morning, the regular army setting-up exercises. For constipation, more stress is laid upon the morning exercises. The patient should go through an entire system, exercising as far as possible every muscle in the body, but taking particularly well those that will develop the abdominal muscles.

Probably the best are the following:

Lie flat on the back with the arms folded on the chest; rise gradually to a sitting position without bending the knees; then gradually let the body go back to the original position. This may be repeated from ten to twenty-five times, as the ability of the patient increases. A variation of this is to lie flat on the back with the hands above the head, rise to a sitting position, at the same time bringing the arms forward and down until the fingers touch the toes, then slowly going back to the original position.

Lie flat on the back with the arms folded, raise the lower limbs until they are at right angles with the body, then slowly lower to the original position. This should be carried out without bending the knees if possible. There are several variations of this. For example, bringing the lower limbs up about 45 degrees instead of at right angles to the body (90 degrees) and then describing a circle with the feet. This exercise should be done from ten to twenty-five times.

Stand with the feet several inches apart, keeping the knees straight, bend forward and touch the floor with the finger tips and then come back to the original position.

Lie prone upon the abdomen, holding the body rigid, push up with the arms until only the hands and toes are touching, then back to the original position, without bending the body.

Of course, there are many varieties of movements that are of value. These are found well described and illustrated in the Manual of Physical Training of the United States Army, which can be obtained by sending fifty cents to the Superintendent of Documents, Washington, D. C.

It is also a fact that holding the body in the proper position, such as required by military service, is of advantage; for when the chest is held up, the abdominal line is straightened, abdominal structures are held in place, and there is less tendency to enteroptosis.

Among the recreative exercises that are of particular value are: swimming, walking, horseback riding, golf, and tennis. These act both directly and indirectly.

Abdominal Support. Where the body is held in correct position there is usually little need for abdominal support, but to require the patient to maintain the correct attitude during the waking hours is sometimes more than the physician can expect, and while, of course, this should be the ideal, it is often necessary to give some mechanical assistance to the abdomen when there is a tendency to enteroptosis. A snug fitting abdominal binder will often give a great deal of relief.

Diet. - Proper eating favors proper digestion, proper assimilation, and proper elimination. This includes not only the proper foods, but eating them in the correct way; that is, with sufficient mastication and insalivation. While improperly digested food may cause diarrhea, it often results in constipation.

Laxative foods are among the most important aids in treatment. The question is often raised as to whether or not food with much refuse matter is an advantage or disadvantage, and it seems that a certain amount of individualization is necessary. In cases where there is a tendency to frequent impaction, it would seem that the best results are obtained by giving food with a minimum of refuse. On the other hand, there are instances where the food material does not seem to be properly passed along the intestinal tract unless there is sufficient bulk.

There are no special articles of food that will always meet the requirements. It is usually best to give the patient a list of those that are known to be of value and let the selection be made of the ones that are palatable to the individual; this also gives variety. It should be understood that these articles are not purgative and have a laxative influence only when taken in sufficient amount. Among the foods that should be particularly remembered are the following:

Fruit juices, particularly orange juice and grape juice.

Fresh fruits, particularly figs, also oranges, apples, grapes, and, in fact, almost any fruit except bananas.

Cooked fruit, particularly stewed prunes, peaches, apricots, and apples that have been cured with the peeling on.

Certain cereals, particularly oatmeal, the bran products, the Graham products, and any preparations made from the whole grain. These may be served with cream and some of them in the form of bread or cakes. The bran products are particularly laxative. They are put on the market by several manufacturers and some of these give books of recipes showing how they may be served.

Many other foods, such as butter, cream, buttermilk, and honey may be of value.

Olive oil will be discussed under the head of medication but it is also a food. In many cases its use in sufficient amounts is all that is required to correct constipation.

Water. A sufficient intake of water is essential and sometimes cases are found in which this measure alone suffices. In many instances drinking a glass or two of water when first arising in the morning seems to be of marked benefit.

Medication. Olive Oil. This is used in many ways. Some prefer to give it with the meals and some between meals. It has seemed to me that the best results were obtained by giving in one dose at bedtime. ½ to 1 fluidounce (15 to 30 cc.) usually meets the requirements, although this may be considerably increased if it is not objectionable to the patient. Probably the best way to give it is with fresh orange juice, the orange juice itself having some laxative value and usually disguising the taste of the oil.

Liquid Petrolatum. This has received a great deal of attention in the last few years. It is an excellent laxative and usually without any unpleasant side effects. Its action is purely mechanical as it is not digested. Through its lubricating quality it facilitates the passage of the food material along the intestinal canal. In some cases there is a tendency for this product to escape from the rectum and soil the clothes. There seems to be little relief for this and when such a result is found to obtain, the remedy should be discontinued. The usual dose is ½ to 1 fluidounce (15 to 30 cc.) at bedtime. It may be given just as suggested for olive oil.

Cascara Sagrada. This drug was somewhat in disrepute before its proper preparation was understood, because its use was often attended with abdominal pain. It was discovered that by aging the drug in the crude state that this quality largely disappeared, and the usual preparations of cascara now on the market seldom cause discomfort. This is particularly the case if, instead of giving one large dose, it is employed three times per day in small doses. An additional advantage of this method is that cascara itself has some value as a bitter tonic. Probably the best way to order it is in the form of the fluidextract or aromatic fluidextract and have the patient take the necessary amount before or after each meal. The dose can be increased or diminished till the required amount is determined. In this way also the drug can be gradually discontinued when other measures, as exercise and diet, have brought about such relief that medication is no longer necessary. With the exception of olive oil and liquid petrolatum, cascara is possibly the most valuable drug in the treatment of chronic constipation.

There are many other drugs that may be used to advantage. Among these are: phenolphthalein, compound licorice powder, and effervescent sodium phosphate.

The following prescription may be used:

℞		or
Potassii Bitartratis,	℥j	30|0
Sodii Sulphatis,	℥ij	60|0
M.		
Sig.—Teaspoonful in water early each morning.		

This may be taken in orangeade or some other pleasant beverage.

Enemas. The use of enemas is sometimes indicated for temporary relief; in some cases they may be used to advantage for a considerable period of time. The probability is, however, that the prolonged use of enemas may be attended with considerable disadvantage to the patient. Usually they should be employed only until other measures can bring about a sufficient amount of relief. For this purpose the patient may be instructed that if the other measures instituted do not produce desired results by bedtime, the enema may be used. It is certainly undesirable, except in emergency, to use the irritant "purgative enemas." Probably the most satisfactory enema is that of plain water, or plain water with olive oil.

Suppositories. These should only be used in emergencies. When frequently employed they produce irritation.

It should certainly be understood that all such measures as suppositories, enemas, and medication are only for temporary results, and they should be used only until the patient can establish the habit of proper bowel function.

There are some cases in which the habit of constipation has become so fixed, and some in which for unaccountable reasons all mild measures seem to fail, that continued medication may be necessary.

DIARRHEA

General Statement. Definition.—The word diarrhea means literally *to flow through.* It is therefore that condition in which there are watery evacuations of the intestinal tract.

There is considerable confusion in the use of the terms diarrhea and dysentery. It would be an advantage if the dysenteries were considered as only those cases showing definite pathological changes in the intestinal tract, and diarrhea those cases of hyperactivity in which there is no organic damage. The disease is often further subdivided into special groups, such as the diarrhea of infancy, and food diarrhea. The condition may also be a symptom of some other disease; for example, some authors speak of the treatment of the diarrhea in discussing the management of dysentery. This discussion will be confined to the common condition that might be called food diarrhea, as it occurs in adult life or late childhood. The so-called diarrhea of infancy does not come within the scope of this article.

Incidence.—It is a condition that affects all classes and conditions of people. It is more common during the summer months, largely due to the character and quality of foods. It is more common in late childhood when these individuals, without sufficient judgment and discretion, avail themselves of a large amount of liberty, which they often have, in the matter of diet. The condition is also fairly common in that period of life when chewing facilities become defective and the digestive ability impaired.

Etiology.—There are many factors that contribute toward the production of this condition. The immediate cause is food that is either an irritant in character or becomes so, or that is beyond the digestive ability of the individual. Some have a particular inability to digest certain articles of diet, and are subject to inconvenience whenever they indulge in them. At other times the individual may be in such a condition, or some usually simple article of food may be of such a character, that the disturbance is precipitated.

Course and Prognosis.—This is almost universally favorable particularly if the disturbing factor can be found and eliminated. The usual duration is from one or two days to a week, the symptoms gradually subsiding and the patient rapidly returning to normal. It will be understood that we are not considering here those conditions characterized by pathological changes in the intestinal wall.

Symptoms and Diagnosis.—There is seldom much difficulty in establishing a diagnosis. The most important factor is the history of dietary indiscretion, such, for example, as unripe fruit or a meal hastily eaten and improperly masticated. In many cases the patient can give a definite history of having indulged in some article of diet that is known to have caused a similar disturbance in the past. In persons of advanced years, the presence of impaired chewing facilities will often suggest not only the character of the condition but the cause.

The onset is usually sudden, coming on within a few hours after the dietary indiscretion. There is often a preceding nausea or vomiting, with pain which is usually cramp-like in character. This pain may be entirely absent or may be quite severe; it is usually confined to the abdominal region and may be constant or paroxysmal. There may be cramping of the legs, headache, or general discomfort. Nausea and vomiting are fairly frequent symptoms and often precede the diarrhea; these symptoms may subside early or be more or less persistent. There may be fever, though there is seldom the high temperature of dysentery; a large percentage of cases are practically afebrile. There is a marked tendency to weakness and a general feeling of exhaustion, which is particularly pronounced when the loss of fluid is excessive. Sometimes the body may be considerably dehydrated in the course of a few hours. The number of intestinal evacuations varies, there may be only a few during the entire attack or there may be many dozens. The characteristic evidence is the watery character of the material passed; there may be at first considerable consistency, but this is soon lost. The dejecta varies in appearance, sometimes being dark, but usually greenish in color. There may be considerable griping and tenesmus associated with each passage. There is usually some distress and tenderness of the abdomen, and it may be distended or be so contracted as to become scaphoid in type.

Prophylaxis.—The essential factors are, naturally, care in the quantity and quality of food and proper mastication. Very often a tendency to this condition may be entirely relieved by having the patient secure good chewing facilities, or by having one with proper facilities devote the right amount of time and care to eating. Another factor of importance in prevention is the avoidance of constipation. It is not unusual to find cases that are directly traceable to this factor.

Treatment.—The condition is largely self-limited, the tendency being for the patient to return to normal when nature has eliminated the offending material. The efforts of physicians should be directed largely toward aiding nature in proper elimination, in giving the patient temporary relief, and in the management of convalescence.

General Care.—Rest in bed is desirable in all cases, this alone having a decided tendency to reduce the number of intestinal evacuations. In the mild case it is sometimes inadvisable to enforce this restriction; in the severe cases, it should be insisted upon. There is usually not the necessity here of preparing for a long siege as in dysentery, but it is naturally desirable to select treatment quarters that lend themselves to comfort and convenience. The majority of cases do not require expert nursing; but in the severer cases it is highly desirable.

There should be a daily cleansing bath and particular care should be exercised to avoid irritation of the skin in the region most apt to be made tender by the excreta, which are often irritating in character.

Diet. If there is any tendency to rapid dehydration, water should be given frequently and freely. Often in cases where vomiting is present, it is necessary to control this symptom before water will be retained, as the giving of water during this time merely precipitates emesis. These are usually short stormy cases and the necessity for a high caloric intake is seldom present, and in the matter of diet it is particularly necessary to individualize. All foods that are laxative in character or that contain much refuse matter should be avoided. Among those articles that may be employed to advantage are such as tea or coffee, gingerale, malted milk or similar preparations made up with water, well cooked cereal broths, simple strained soups. Milk sugar may be used to advantage. As the condition improves such additions may be made as toast, gelatin, custard, soft boiled eggs, and well cooked cereals. The return to a normal diet should be slow and carefully regulated. The offending article of food, if known, should be avoided for a long time.

General Medication.—In the acute case occurring soon after the dietary indiscretion, it is usually desirable to empty the stomach, if this has not already been done. The most satisfactory way to do this is by having the patient drink warm salt water to which may be added sodium bicarbonate. Glasses of this should be taken repeatedly until sufficient emesis has been effected. Sometimes the stomach will be emptied with the first glass, while again several glasses will be required. The stomach pump may be used. The most desirable agent for intestinal elimination in castor oil. After the stomach has been emptied by one of the measures just suggested, the oil should be given as soon as nausea has sufficiently subsided. If there is much abdominal discomfort, one fluidrachm (4 cc.) of paregoric may be given with one fluid ounce (30 cc.) of castor oil; this seems in many cases to have a beneficial effect upon the tendency to nausea, to produce thorough elimination, and to exercise an astringent after-effect. In a large percentage of cases it is the only medication required. If the diarrhea persists one of the following prescriptions may be employed:

℞		or
Bism. Subnit.,	ʒiij	12 0
Spir. Chloroformi,	fʒij	8 0
Tinct. Opii Camph.,	fʒiv	15 0
Mist. Cretæ,	q.s. f℥iij	90 0
M.		

Sig.—Tablespoonful every three hours till relieved. (Shake-label.)

℞

		or
Magnesii Sulph.,	ʒiij	12 0
Tinct. Opii,	fʒss	2 0
Acidi Sulph. Arom.,	fʒiss	6 0
Aquae Menth. Pip.,	q.s. f℥iij	90 0

M.

Sig.—Tablespoonful every four hours till relieved.

If the condition persists, it is always advisable to see that sufficient elimination is maintained, as there may be frequent watery evacuations with retention in the intestinal tract of a considerable amount of material. For this further elimination castor oil may be used or liquid petrolatum. In persistent cases it may be employed every two to three days, depending upon the apparent indications.

Local Measures.—In the majority of cases nothing in the way of local measures is indicated. Among those that are at times found of advantage are applications to the abdomen. Considerable relief is sometimes obtained by the use of a hot water bottle or the electric pad. A time honored measure is the use of hot turpentine stupes. Colonic irrigation will often be of benefit, probably the most satisfactory solution being warm starch water. This may be ordered by instructing that a pint of starch be prepared just as for starching linen, to this is added about three pints of warm water so as to make it thin enough to use. This is introduced as warm as can be comfortably tolerated and the patient instructed to retain as much as possible for several minutes. Warm saline irrigations may be employed in the same way. There is not the indication here for more active local medication as in dysentery.

Symptomatic Medication.—The measures previously suggested usually meet all of the requirements, but there are at times cases with symptoms that require special measures.

Pain. It is sometimes necessary to give a preliminary hypodermic of morphine and atropine; it is seldom necessary to repeat this, as the management of the case as previously outlined will meet the further requirements.

Nausea. This is often, as in the case of other abdominal diseases, a distressing factor. The temporary withholding of all food is usually of advantage. Such measures may be tried as small amounts of vichy, seltzer, gingerale, or other carbonated drinks. If these fail and the condition does not subside under the other measures that have been suggested, bromides should be given. The use of an ice bag to the head is of assistance, also hot applications to the abdomen.

Intestinal Activity. The management of the case as elsewhere suggested usually meets all of the requirements. In some cases it may be necessary to check an exhausting diarrhea by increasing the amount of opiates.

Convalescence. The digestive tract is often left in a sensitive condition. It is, therefore, necessary to exercise considerable care in the matter of the patient's return to a normal manner of living. The diet should be carefully selected so as to avoid the likelihood of further inconvenience. Excessive physical activity should be avoided until the patient is in such a condition that trouble may not result. The use of tonics is contra-indicated, at least until such time as there will be no danger from an artificially created appetite or feeling of strength.

BACILLARY DYSENTERY

General Statement. Definition.—Dysentery is a disease characterized by inflammatory changes in the intestinal tract. The process is confined largely to the colon, though the small intestine may be involved. Literally the term means diseased intestines; therefore it indicates a condition in which pathological changes have taken place, thus differing from diarrhea. Many synonyms have been used, as colitis, ileocolitis, enteritis, and bloody flux. The type is sometimes designated by such terms as ulcerative colitis, membranous colitis, or mucous colitis. Acute and chronic forms are recognized.

Incidence.—The disease may occur in any climate and among people of any race or class. All ages, kinds, and conditions may be affected. Children are probably more commonly affected then persons of adult age, though here the disease is usually called colitis, ileocolitis, or infantile diarrhea. Aside from the infantile conditions, the most common periods of involvement are early adult life, when there is most exposure to the etiological factors, and old age when there is least resistance. It is naturally more frequent among those living under unfavorable hygienic conditions. The disease is more common in the summer season and in warm climates. At times it may assume epidemic form, this is particularly the case where there are groups of people in close association, as in construction work or army camps.

Etiology.—The causative organism may be any one of several groups of bacilli that have been more or less thoroughly studied in recent years. Most common of these are the Flexner and the Shiga types. The world is much indebted to such investigators as Shiga, Krause, Flexner, Strong, Duval, and others for their extensive investigations and practical work. It is seldom in general practice that the physician has a chance to determine the particular strain of organism present.

Among the contributing factors are season, climate, exposure, lowered body resistance, unhygienic living conditions, particularly the eating of much uncooked food, and the drinking of contaminated water.

Course and Prognosis.—Under present conditions in this country death from bacillary dysentery is comparatively rare, particularly in adults; and the severer types so much discussed in literature are not often met in practice. The usual duration of the severe symptoms is from three to ten days, though considerable inconvenience may be entailed for a much longer period; that is, there is rather a tendency for the acute stage to pass into the more chronic form and continue with remissions and intermissions for many weeks.

Symptoms and Diagnosis.—There is seldom much difficulty in diagnosing the typical case, and this is particularly easy when the disease is epidemic. Confusion is experienced mainly in the handling of the atypical case, or the one that is complicated by some other preceding or associated disease.

History. The investigation should include such information as possible exposure where the disease is endemic or epidemic, the character of food and drinking water, and the past history as to intestinal disturbances.

Onset. This is usually rather sudden, beginning in most cases with abdominal pain, general discomfort, fever, diarrhea, and often nausea. In some cases the onset may be gradual and preceded by a period of malaise.

General Symptoms. As suggested in the preceding paragraph there is usually fever, which sometimes is quite high. There is general discomfort including headache, pains in the back and over the body. There is a tendency to accelerated pulse, increased respiratory rate, and, in many instances, decided nausea, and even more or less persistent vomiting.

There is a marked tendency to prostration with a rapid loss of weight, which is due not only to a lack of nourishment, but to the dehydration incident to the diarrhea. There is usually the dry mouth, parched lips, coated tongue, and other evidences of intestinal infection and dehydration.

Nervous phenomena are usually present. There is irritability and insomnia beyond that to be expected from the degree of discomfort, and in many instances, particularly in the protracted cases, there develops a toxic neuritis. It is not unusual for the physician to be in grave doubts as to the presence of meningeal inflammation, so closely do the symptoms sometimes simulate that condition.

Local Symptoms. There is usually considerable abdominal tenderness, and pains that have a tendency to be paroxysmal in character. The characteristic symptom is diarrhea, the evacuations becoming more and more frequent and more associated with tenesmus, and in severe cases reaching the point that the desire for evacuation is almost constant. There is a tendency to irritation of the skin in the region of the anus; sometimes this becomes quite marked and considerable local inflammation develops. The sphincter muscle often relaxes leading to prolapse of the rectum. There may be vesical tenesmus and dysuria, probably due largely to the elimination of fluid by the bowels, resulting in a highly concentrated urine.

Laboratory. The principal laboratory aids are those obtained from a bacteriological study of the feces and by the agglutination tests. In expert hands these measures may be invaluable, especially where the discovery of the particular strain of organism may lead to the use of serum treatment. There is usually some albumen present in the urine, and often other evidences of renal irritation. There is nothing characteristic in the blood. In protracted cases there is a tendency to anemia, and the white count will sometimes enable one to differentiate from sprue and some other conditions.

Differential Diagnosis.—Only the microscopic examination of the feces will positively differentiate the bacillary from the amebic infections in the beginning of the disease. As a rule the amebic infection is, even in its early stages, less characterized by febrile reaction. The history and the course of the disease, in the absence of other symptoms, will usually suffice to differentiate pellagra, malignancy, food diarrhea, and other conditions that might be confusing. The agglutination tests may be of value.

Prophylaxis.—The principal measures in prevention are those that come within the province of Public Health, such as purification of water, the disposal of sewage and garbage, and other kindred measures. From an individual standpoint those precautions most necessary are the cooking of food and boiling of water when the disease is prevalent, and proper cleanliness in caring for a patient sick with this disease.

Treatment.—Many plans have been suggested and no one measure has been found of paramount value. It is probable that more depends on the exercise of infinite care in every detail of management than on any particular drug or remedial measure. The three main factors are prevention of the spread of infection, temporary relief from discomfort, and effecting a cure of the disease process.

General Care. All cases of dysentery, no matter how mild, should be placed absolutely at rest in bed; this rest should be both mental and physical, and should include the exclusion of all business and domestic worry. This measure properly carried out is of more importance than is often realized.

Treatment quarters should be selected from the standpoint of isolation, and for the convenience of those in attendance. A room connected with a bath is highly desirable, and in warm weather a screened porch adds much to the comfort of the patient and nurse. The treatment quarters should be screened if at all possible. The room should be selected also with regard to sunlight, ventilation, and heating, depending upon the climate and the season of the year. Ventilation is particularly essential, due to the unpleasant odors incident to the disease. The bed should be one that lends itself to the comfort of the patient and convenience of handling. It must be borne in mind that the use of the bedpan, colon irrigations, and other measures will tax a nurse even under the most favorable conditions.

The patient should have a daily cleansing bath, and the skin area coming in contact with the discharges should be kept clean at all times and either dusted with some bland powder or anointed with some mild ointment, as bismuth paste, depending upon which seems to give the maximum of comfort.

During the febrile stage an ice bag to the head should be used here as in other conditions characterized by high temperature. In cool weather every effort should be made to keep the body warm, this may be effected by proper covering and by the use of hot water bottles or an electric pad. It is particularly desirable to keep the abdomen warm; a flannel binder will serve for this purpose when direct heat is not being applied. There is rather a marked tendency for the collection of sordes which necessitates particular care of the mouth. Any of the pleasant tasting preparations for this purpose may be used. If the patient is accustomed to any one of these, it is probably best to continue its use.

As there is a marked tendency to rapid dehydration, water should be given freely, either as such or in the form of some acceptable beverage. Very hot or very cold drinks are undesirable but liquids may be given warm or cool.

When nausea is marked it may be difficult to give sufficient liquids by mouth until that symptom is under control. At times resort must be had to hypodermoclysis. Small amounts frequently repeated are sometimes retained when larger drinks are vomited. Carbonated beverages often seem to be handled better.

Diet.—Here there is considerable divergence of opinion. Such excellent clinicians as Moret and others use milk as their mainstay in nutrition. Many others employ only the simplest gruels and broths until the acute stage has passed. I have employed a diet somewhat as follows:

During the acute stage when nausea is marked, it is often difficult to give any nourishment; at this time small amounts of ginger ale or other carbonated drinks may help to keep up the water supply and at the same time allay nausea. As soon as the nausea subsides, water is given at very frequent intervals. It may be given as such or in the form of carbonated drinks, or the various other articles of liquid diet. Many patients will take some prepared food with a certain amount of relish, if given in small amounts, such as malted milk or similar preparations. Diluted lemonade or fresh pineappleade with milk sugar may be used; also weak tea and coffee with milk sugar. Some tolerate well the cereal broths or soups made with just enough meat to give flavor, (as some boney part of a chicken) with rice or barley thoroughly cooked and strained, all the grease skimmed off, and about 25 per cent of boiled milk added. These can be made not only to be palatable, but to supply a reasonable amount of nourishment. The various liquid proprietary remedies that were at one time so much relied upon in these cases and in typhoid fever, while they do not contain much nutritional value, may at times be of some advantage. They are usually well tolerated and often rather gratifying to the patient. In some cases buttermilk freed from fat, particularly the home churned product, is well handled if not given in too large amounts. As soon as the condition of the patient improves, the diet may be augmented by boiled milk, gelatin, and custard. Later toast and well cooked cereals may be added. Considerable care must be exercised in the return to a normal diet.

General Medication.—There is little doubt about the value of a preliminary dose of castor oil, and repeating this during the progress of the disease may be of marked benefit. It should be remembered that the tendency of the drug is to sweep through the intestinal tract and then to have a constipating effect. Many favor the preliminary large dose of oil followed by repeated small doses, and Moret relies upon this drug as the principal medication. Some clinicians prefer the use of magnesium sulphate, or some other saline, either using one of these as a preliminary purgative only, or following the first large dose with repeated, small amounts. This treatment often gives excellent results.

The following plan has seemed to meet the requirements in a large proportion of cases. The treatment is begun with about ½ to 1 fluidounce (15 to 30 cc.) of castor oil and 1 fluidrachm (4 cc.) of paregoric. In the early stage of high temperature and much general discomfort and before prostration has materially developed, the preliminary purgative is followed by medication somewhat like this:

℞		or
Acidi Acetylsal.,	gr. xl	2.5
Phenylis Salicyl.,	gr. lx	4.0
Bism. Subnit.,	gr. ccc	20.0
M. ft. cht. no. x		

Sig.—One every 3 or 4 hours.

Unless the condition is progressing favorably, castor oil or liquid petrolatum is used in two or three days.

Prescriptions like the following have been employed for generations. They have a field of usefulness.

℞		or
Bism. Subnit.,	ʒiij	12.0
Spir. Chloroformi,	fʒij	8.0
Tinct. Opii Camph.,	fʒiv	15.0
Mist. Cretæ,	q.s. f℥iij	90.0
M.		

Sig.—Tablespoonful every 2 to 4 hours. (Shake-label.)

℞		or
Magnesii Sulph.,	ʒiij	12.0
Tinct. Opii,	fʒss	2.0
Acidi Sulph. Arom.,	fʒiss	6.0
Aq. Menth. Pip.,	q.s. f℥iij	90.0
M.		

Sig.—Tablespoonful in water every 2 to 4 hours as needed.

Even with repeated negative laboratory findings one should always consider the possibility of amebic infection if dysentery persists. The patient may be given the benefit of the therapeutic test by injections of emetine hydrochloride.

Ipecac or emetine has been recommended as of value in bacillary dysentery. It is possible that those cases responding to this drug were unrecognized cases of amebic infection.

Local Measures.—In addition to the abdominal binder previously mentioned, certain local measures seem to relieve discomfort and to hasten recovery. These are not to be used as a matter of routine, but to be employed when particularly indicated by discomfort or the persistence of the disease. Among these are warm applications to the abdomen. The most common and probably the most satisfactory is hot turpentine stupes, these should cover the entire abdomen, and be applied hot and used for considerable periods of time to be of much value. The electric pad may contribute much to comfort.

In protracted cases it is often of advantage to use the proctoscope and to treat exposed ulcers in the lower segment of the colon by applications of silver nitrate or some other agent that will hasten recovery.

Colon Irrigations. Various solutions have been employed, such as normal saline or silver nitrate. Warm enemas of cooked starch water apparently are of much value. They are prepared by having a pint of cooked starch made just as for starching linen, to this is added about three pints of warm water; this is injected slowly, and its introduction may often be favored by elevating the hips and turning to the right side. The patient is instructed to retain as much as possible and for several minutes. The solution should be as warm as can be comfortably tolerated. It has a decidedly soothing effect.

Symptomatic Treatment.—The pain and tenesmus may be of such a character at first as to require a hypodermic of morphine, but it is seldom necessary to use this but once, if at all. The various measures previously suggested will usually suffice to meet the requirements. If there is much headache or body pain codeine may be used, or codeine and acetylsalicylic acid together, though the latter agent should be employed with care and only during the early stage, before much prostration has developed.

Nausea is often a disturbing feature, not only from the inconvenience it entails, but because it limits the possibility of the administration of water, nourishment, and medication. The measures of general care, such as rest, an ice bag to the head, and limitation of food, will usually meet the requirements. Small amounts of carbonated drinks may be of value. When such measures fail, bromides should be used. Strange as it may seem, castor oil is often one of the most valuable agents in arresting nausea. The preliminary dose may be promptly rejected, but if repeated as soon as emesis has subsided, the second dose is usually retained.

Serum and Vaccine.—Within recent years progress has been made in the employment of these agents. The serum treatment and the injection of the Shiga bacillus vaccine have seemed to be of particular value. Where the specific organism can be demonstrated the serum is certainly worthy of consideration. The polyvalent products are frequently employed. All of these should be used with the usual precautions to prevent unfavorable reaction. Vaccines, both autogenous and stock, have been extensively used, particularly during and since the late war.

Convalescence.—There is a tendency for these patients to want to get up as soon as the major symptoms have been relieved, and this is probably due in part to the nervous imbalance that is so commonly present. It cannot be too strongly emphasized, particularly in the severe infections, that a protracted period of rest is necessary, and the return to full diet and activity should be carefully supervised. Unfortunate results often follow the neglect of this precaution. Particularly to be avoided is the early use of tonics which, by creating a false feeling of strength or appetite, may lead to indiscretions.

AMEBIC DYSENTERY

General Statement. Definition.—Amebic dysentery is that type of intestinal disease that is the result of infection with the entameba histolytica. Various subdivisions as acute, subacute, chronic, relapsing, etc., are recognized.

Incidence.—In the present day of general travel, this disease is an important consideration everywhere, but particularly in tropical or semitropical countries such as Mexico, Central and South America, the Phillipine Islands and India, or those sections in close touch with them. It is increasingly more prevalent in the southern portion of the United States and it is probable that the condition is more common than is usually supposed; that is, not being suspected, it is not often searched for and is therefore overlooked. No race, age, sex, class or condition is immune. It is naturally more common in active adult life and among men, as they are more exposed.

Etiology.—The exciting cause is the entameba histolytica. Various predisposing causes are known. Among them Simon mentions such factors as tropical climate; the rainy season; summer; late spring and early fall particularly; low altitudes; and vocations that expose to unfavorable hygienic conditions.

Course and Prognosis.—Amebic dysentery is distinctly chronic, with a marked tendency to persist or to recur after apparent cure. As usually seen it is not associated, even in the early stage, with the markedly stormy symptoms that characterize the acute bacillary type of dysentery. There are often remissions or intermission of considerable duration. The majority of cases as seen in routine practice are ambulatory, many of them attending to their usual duties with only comparative inconvenience while some are laid up a certain percentage of their time Not infrequently business men, school teachers, and others, will give a history of dysentery for many years with but partial impairment during that period.

The disease, as it is seen in the southern part of the United States, is most disturbing from the standpoint of causing persistent partial disability and the inconvenience that necessarily goes with it.

Of course, complications are a factor of considerable importance.

In beginning the treatment, it is certainly advisable to have the patient understand that the clinical symptoms may be relieved in a very short time, but that a cure is to be obtained only as the result of continued, conscientious effort. Even then, the possibility must be recognized of a definite cure not being effected and the condition recurring.

Symptoms and Diagnosis.—There are no characteristic symptoms of amebic dysentery and the diagnosis is often reached only by availing ourselves of all data obtained by a thorough investigation. This consists particularly of an analysis of the history, the laboratory investigation, eliminating other conditions that might account for the symptoms, and the therapeutic test.

History.—Dysentery should be suspected as being amebic if the patient has been in any section where the condition is endemic; such, for example, as Mexico, South and Central America or the West Indies. The history of association with someone who has had a chronic dysentery is also significant. The history of residence in the tropics, even though it were many years previous, should be given due weight, particularly if there was any intestinal disturbance while there or any tendency to such since that time.

The history of chronicity is of marked importance. This will be considered further under the head of diagnosis by elimination.

Laboratory Examination.—The only positive evidence of the disease is the presence of the entameba histolytica in the intestinal contents. In other words, a positive laboratory report is of absolute value.

On the other hand, a negative laboratory report does not entirely eliminate the possibility of the disease.

Very often the organism may not be found until repeated and careful examinations have been made under the most favorable conditions.

A case seen by the author had persisted for twenty years, during which time the patient had an average efficiency of only about fifty per cent. Repeated examinations had been made by competent observers. Another examination was made and five of the organisms were found in the first field.

Method of Examination. There is still considerable difference of opinion as to the most desirable way of making the investigation.

An examination of the bowel contents, after it has cooled, is of very uncertain value.

A good working plan is as follows:

The patient is brought to the office or hospital, if possible, otherwise the necessary apparatus is carried to the bedside. In any event the same measures are carried out.

The patient is placed in the knee-chest position or in the left lateral position with the knees drawn up. A proper light and a head mirror are employed. A proctoscope (as Kelly's) of proper size for the particular case is used and it is inserted as far as it can be passed with convenience, the obturator removed, and by the use of reflected light the visible part of the bowel wall is thoroughly examined.

Some material of the proper character is taken up with sterile cotton on the end of a long applicator and this is immediately transferred to a warm slide, diluted with warm water, covered with a warm cover glass, put on a warm stage, and subjected to immediate examination. The advantage of this is,

First. The opportunity to investigate the general condition of the bowel wall particularly as to the presence of ulcers, malignant growths, foreign bodies or constrictions.

Next. The operator is enabled to get the type of material for examination that experience has shown to be most apt to contain the organisms.

Several particles of material for examination, including both mucous and fecal matter, should be collected from different areas and mixed on the slide.

In introducing the proctoscope, petrolatum or any oily material should not be used, for the reason that, if it be mixed with the specimen, it interferes with the examination. Some of the lubricant jellies may be employed to advantage.

It will be found convenient in preparing the microscope and slide, to use a small square bottle which is filled with sterile water at a temperature of about 105°F. This is put on the mechanical stage and the slide and cover-glass are laid on top of it. When the specimen has been collected, it is put on this warm slide, and the sterile water in the bottle is used for diluting. This plan avoids the undesirable possibility of having the slide or cover-glass too hot or using water that is too hot, as excessive heat, as well as cold, will interfere with the movement of the organisms and prevent their recognition.

If the findings are negative, one examination is no more sufficient than would be one examination of the sputum in diagnosing tuberculosis. This is particularly the case where patients are seen during a period of remission or where they have had partial treatment.

Diagnosis by Elimination (Differential Diagnosis).—In those instances where the ameba cannot be demonstrated, it is sometimes possible to make a fairly definite diagnosis by eliminating all other conditions that might be productive of the symptoms which the patient presents. This applies particularly to the chronic cases. There are only certain diseases that would cause intestinal hyperactivity for long periods of time, without definitely manifesting their identity. It is possible therefore by the duration of the process to cut down the possibilities to a very few conditions.

For example, if the disease has persisted for months or years and has failed to respond to the treatment for bacillary dysentery, we can eliminate that condition with reasonable assurance.

Malignant growths of the intestine usually do no persist for many months, and seldom, if ever, for many years, without making themselves known, at least at autopsy.

Pellagra shows a seasonal activity and usually gives cutaneous or nervous manifestations early in the process and almost certainly does so in the course of years.

Tuberculosis of the intestinal type has a tendency to run a fairly rapid course, is usually secondary to involvement elsewhere, and is not so subject to periods of remission. It is usually characterized by other manifestations fairly early in the process of its development. The laboratory may lend assistance.

Food Diarrhea. The examination of the bowel contents, the presence of defective chewing facilities, the history of disturbances following dietary indiscretions and the response to simple measures of treatment usually tend to promptly eliminate this condition.

It might be said that any condition of chronic intestinal hyperactivity that has resisted treatment for common diarrhea and dysentery and has persisted for years without showing evidences of other diseases, is probably amebic dysentery.

Therapeutic Test.—Sometimes cases are found in which the ameba cannot be demonstrated even after repeated and careful examinations. These cases have failed to respond to treatment for other conditions that might be responsible for the intestinal symptoms. Careful investigation and the process of elimination have tended to exclude other possibilities and favor the probability of amebic infection. These cases should have the benefit of the therapeutic test for amebic dysentery.

This may be carried out by using an intramuscular injection of one grain (0.065 Gm.) of emetine hydrochloride each day for five days. During this time the patient is given no other medication and is kept under the same living conditions as those during which the disease has persisted.

Under these circumstances there is probably no disease that would show a marked tendency to relief except amebic infection, and this usually shows marked benefit or entire relief of symptoms. This plan certainly entails very little inconvenience and carries practically no element of danger.

It has been claimed by some that bacillary dysentery is favorably influenced by ipecac. This is far from having been established. It can be said with more safety that a dysentery that is symptomatically relieved by emetine alone, is almost certainly amebic. It is probable that those cases that have been reported as bacillary dysentery relieved by ipecac, were unrecognized cases of amebic infection. The following is rather typical.

Miss B., a school teacher, presented herself for treatment for underweight and impaired efficiency. Upon investigation the history was obtained that she had several bowel movements daily. When some surprise was expressed that she was not seeking relief for this condition, she explained that she had had excessive bowel activity for twenty years. She seemed to regard it as a matter of course. Repeated laboratory examinations were negative. A careful general examination and particularly the fact of the duration of the condition tended to exclude other causes. She was given several hypodermics of emetine hydrochloride with prompt symptomatic relief, and it seemed that a satisfactory working diagnosis was established. This was borne out by the subsequent response to continued treatment.

Prophylaxis.—In this disease, as in other infectious conditions, prevention resolves itself into individual (or personal) and general (or state) measures.

The general considerations include such factors as pure water supply, careful regulation of markets and proper disposal of sewerage.

Personal measures are largely covered by habits of personal cleanliness, the proper disposal of excreta and by prompt and thorough treatment of all infected individuals.

Treatment. General Care.—A case that is acutely sick should have the benefit of all the general measures that are employed for the relief of bacillary dysentery. That is, absolute rest in bed, careful diet, etc., as detailed on page 490.

It is the usual experience, however, that the majority of cases that come under observation are ambulatory, and it does not seem to be necessary or desirable in most of these to interfere with their reasonable activity, particularly as by present methods clinical relief can usually be obtained in a few hours or a few days at most.

Where such prompt relief is not obtained, the patient should be subjected of course to the full measure of general care as previously suggested.

Specific Treatment.—Ipecac in the treatment of amebic dysentery is one of the few specifics known to medicine. It has been in use for centuries, but it has been only within recent years that methods of administration have been devised that render its use so safe and comfortable that the disease has been robbed of most of its terrors. The Rio ipecac contains more emetine and less cephaline. It should be used when obtainable.

Ipecac is now used principally in two ways: emetine by needle and enteric pills of ipecac given by mouth. These will be discussed in detail.

General Considerations. In treating this disease there are four principal factors to consider:

I. The Amebae Embedded in the Intestinal Walls. These are reached only through the circulating fluids of the body and this is effected either by the use of emetine by needle or by the alkaloid that is absorbed from the ipecac given by mouth.

II. The Amebæ That are Free in the Intestinal Tract. These are to be found in the food material, scybala and mucus. They are not to be reached through the circulating fluids of the body and their destruction will depend upon a germicidal agent passing down through the intestinal tract and coming into contact with them. They are of importance for the reason that if it were possible to destroy instantly every organism reached by the circulating fluids of the body, the patient would still be subject to prompt reinfection from them just as he was infected in the first instance.

III. Intestinal Ulcers. These constitute just as grave a menace, if the original cause were destroyed, as would ulcers of any other origin. These are to be affected through medication, diet, and such other measures as would be used for ulcers from any other cause.

IV. The General Condition of the Patient Resulting from the Disease. This includes loss of weight, loss of strength, and sometimes the habit of excessive intestinal activity and can be remedied largely by the general care of the patient.

Emetine. Preparation Used. Emetine hydrochloride is the salt employed. The solution put up in sterile ampules seems to give the minimum of unfavorable reaction and should be used exclusively.

Dosage. There is considerable difference of opinion as to the desirable dosage, but it is probable that the best results are obtained from the one grain (0.065 Gm.) dose, given once daily. There is usually some local reaction and it would certainly seem undesirable to subject the patient to the inconvenience and discomfort of several daily injections of fractional amounts, when one injection seems to meet the requirements well. Again, as the drug does not remain active in circulation for any great length of time, and as the desire is to produce a sterilizing effect so far as the amebae are concerned, better results are accomplished by a large dose. For example, in treating syphilis it is the custom to give large doses of arsphenamine at infrequent intervals in preference to small doses frequently repeated.

How Given. The drug is best given by intramuscular injection and the deltoid usually offers the most favorable site. In the case of women who wish to wear sleeveless dresses the drug may be injected into the gluteal region or elsewhere as seems indicated.

There is very often considerable local reaction and sometimes if given hypodermically there may be large areas of discoloration. One writer has suggested that the injection be given in the back so that if these discolored areas develop the patient will not be annoyed by seeing them. In injecting the drug into the muscles there is a certain amount of soreness, but discoloration does not develop.

Ipecac Pills. The five grain (0.3 Gm.) pills are commonly employed and are the most desirable. These are best freshly prepared and coated with phenyl salicylate (salol). The phenyl salicylate is probably of considerable value as a remedial agent. The pills may be ordered as follows:

℞			or
Ipecac, Pulv.,		gr. ccl	16|0
Phenylis Salicyl.,	q.s.		
Ft. pil. ent. no. l			

Sig.—Ten (10) each night as directed.

The physical character of the pills is of the greatest possible importance. If the coating is too thick, the pills may pass entirely through the digestive tract without the coating's being sufficiently dissolved for the intestinal fluid to come into contact with the ipecac. In this case, of course, they are entirely worthless. It is not unknown for the entire dose of pills to pass through, apparently as given.

If the coating is too thin, enough of the salol may dissolve in the stomach for the gastric juice to gain access to the ipecac, in which case intense nausea develops and the contents of the stomach are vomited. Not only is the drug of no benefit in this instance, but there is often difficulty in taking or retaining the pills later, due to the psychic impression.

If the coating is uneven, but sufficiently thick for the pill to pass through the stomach safely, when the even solution of the phenyl salicylate takes place in the intestinal tract, the coating will be removed from the thin spots before it is elsewhere, the ipecac contents will be dissolved out, and a thin hard shell of salol will remain to act as a foreign irritant, particularly if it breaks up leaving ragged edges. It sometimes happens that these shells pass through, causing violent intestinal activity in doing so, and the ejected material has an appearance as though the patient had been eating the shells of birds' eggs.

Some physicians report fairly constant accentuation of intestinal activity from the use of ipecac pills. Others report that they find little difficulty of this type. The trouble is probably with the druggist more than with the drug.

It should be an inviolable rule that the physician examine the pills before the patient takes them, and it will often be found that some of the pills will have to be sent back to be worked over by the pharmacist due to some type of defect in the coating.

Patients often experience considerable difficulty in swallowing or retaining the pills. This is due to several causes.

In the first place, the pills are large, particularly those coated with phenyl salicylate, and more particularly those made up by hand in the local pharmacy. Not only is the pill large, but the coating of the homemade pill is rough. The patient may experience nausea from the mere mechanical inconvenience of swallowing a number of these large bodies.

Again, it is possible that the pills may act as a foreign body in the stomach and be rejected, just as would any other foreign material that was heavy, hard and rough.

Again, there is often a psychic inhibition that is hard to overcome. This particularly obtains where the patients know that they are taking ipecac. If one has had the misfortune to be nauseated once by this treatment, it is sometimes almost impossible to overcome the impression that is made.

For the relief of this difficulty, suggestion is of great value. If the patient can be made to understand that countless thousands of persons have taken the treatment without material inconvenience, and that they will in all probability have no difficulty except the mechanical one of getting the pills into the stomach, a large part of the battle will have been won.

It is sometimes necessary for two reasons to give additional medical aid:

One is to allay nausea and favor quiet and sleep.

The other is to lessen intestinal activity sufficiently to admit of the pills being retained in the intestinal tract long enough for the coating to be removed and the ipecac made available for its specific purpose.

Where nausea alone is a factor, the bromides usually meet all the requirements. My rule is to give from thirty to fifty grains (2 to 3 Gm.) about two hours before the time for taking the pills.

If intestinal hyperactivity is a factor, opium is indicated. A prescription that I have used for many years is as follows:

℞		or
Sodii Bromidi,	ʒiij	12|0
Tinct. Opii,	fʒj	4|0
Aq. Chloroformi,	q.s. f℥iij	90|0
M.		

Sig.—Tablespoonful in water two hours before the pills.

One dose of this is given about two hours before the time for taking the pills and another dose is given later, if indicated.

Time for taking the pills. Two considerations here are of major importance.

One is to give the treatment when the digestive tract is as empty as possible.

The other is to give them at a time when the patient has the benefit of sleep to increase the chance of missing any such inconvenience as nausea.

It would seem, therefore, that the desirable time for this administration is just before the usual sleeping time of the individual.

Dosage. The usual custom has been to give ten or more pills each day, for several days, and then to reduce gradually the number of pills for each dose until one or two are taken each day, this to be continued for a varying length of time.

It has been my experience that it is more desirable to give the full dose each time that the treatment is used and, instead of reducing the number of pills, to lengthen the intervals between doses; that is, instead of reducing the treatment by giving nine, then eight, then seven, then six, etc., to give the full dosage each night during the period of intensive treatment and then skip one night, then two nights, then three nights, and so on, until the treatment is being given once a week and later, once in two weeks. There are several advantages in this plan.

(1) It is possible to give the pills when the digestive tract is as nearly empty as possible. The intensive preparation of the patient for treatment cannot be carried out indefinitely, as the necessity for

keeping up nutrition has to be considered. Therefore, under the old plan of treatment, the pills were given without sufficient dietary preparation or the proper amount of nutrition was not given.

(2) The plan, as suggested, admits of days of large diet and only occasional interference with the nutritional needs.

(3) Very often it is desirable to give some aid, such as the bromides and opium, to enable the patient to handle the treatment properly. This cannot be kept up every night indefinitely, but it can be used occasionally.

(4) It is possibly more desirable to give an occasional thorough treatment than it is to repeat small insufficient attempts.

Suggested Routine. There is no one scheme of treatment that will apply to all cases and here, as elsewhere in medicine, it is necessary to individualize; but the plan here suggested has seemed to meet the requirements in so large a percentage of cases that it might be adopted as routine, to be changed only when indicated, just as in the treatment of malaria we employ the "standard" treatment in all cases unless some deviation seems necessary.

This routine is as follows:

First period (5 days)—1 grain (0.065 Gm.) of emetine hydrochoride by intramuscular injection, each day.

Second period (5 days)—Ten, 5 grain (0.3 Gm.) ipecac pills (coated with phenyl salicylate) each night at bed time.

Third period (about 6 months)—1 grain (0.065 Gm.) of emetine hydrochloride by needle, ten, 5 grain (0.3 Gm.) ipecac pills (coated with phenyl salicylate) and a colon irrigation with quinine solution (1:1000) is given the 1st, 3rd, 6th, 10th, 15th, 21st and 28th night. *i. e.* the interval between each successive dose is lengthened by twenty-four hours.

This treatment is then given once a week for two months; then once every other week for three months; and is then discontinued if the patient is symptomatically well and repeated examinations of the intestinal contents fail to show the organism.

Discussion of Routine Treatment. There are several advantages that might be suggested for this plan of treatment. Many of them have already been discussed.

In the first place, a preliminary treatment of emetine before the pills are taken usually gives marked relief to the patient. Sometimes the relief is apparently complete and the patient experiences no further inconvenience, just as in the treatment of malaria the symptoms often subside after the first day's treatment with quinine.

This preliminary period permits of the patient's taking considerable nourishment in most cases. Not only is the state of nutrition of the patient markedly improved, but the intestinal activity is so controlled that the pills can be properly handled when given. This last consideration is of much importance.

During the first five days of treatment, the diet, of course, should consist of food that can be digested easily and which will leave a minimum of refuse. It is usually possible to give a total of high caloric value.

During the second period of five days, if the patient has been sufficiently relieved, a diet of moderately high caloric value may be allowed, using only material that is digested rapidly and leaves a minimum of refuse. The food is given principally in the forenoon and early afternoon and, for four or five hours before the pills are given, no food at all is permitted. It is particularly undesirable to give fats or alcoholics, as these may cause the coating of the pills to be removed in the stomach.

After the second five day period of intensive treatment, there is an increasing number of days between the times of treatment and in these intervals nutrition can be pushed, with the needs of the patient and his digestive ability being the only restrictions. Of course, it should be remembered that there may still be much damage in the intestinal tract, and the food should be selected with care, but from this period on, except in rare instances, there is little trouble in giving a sufficient amount of nourishment to establish a rapid gain in weight.

On treatment-days during this third stage, the same feeding plan is adopted as previously suggested; that is, the main amount of nourishment is given in the early part of the day and the food is selected with particular reference to its digestibility and lack of refuse. No food at all is permitted for several hours before the time of medication.

Ipecac has been administered often by duodenal tube and this possibility should not be overlooked.

Toxic Effects of Ipecac. Aside from the early emetic and the possibly purgative effect of ipecac, there may develop a form of toxic neuritis from its continued use. In the two cases observed by the author, this developed about the third week of treatment; both cases were getting emetine by needle and ipecac by mouth. The usual outstanding symptom is a sense of motor incapacity. The extremities are affected to the extent that walking becomes difficult, and the use of the hands may be markedly impaired. The symptoms subside in from a few weeks to a few months after the drug has been withdrawn. Outdoor recreation, and physiotherapy, seem of benefit. Strychnine is probably useful.

Stovarsol. This agent has recently assumed a highly important rôle in the treatment of amebic dysentery. It is now on the market in 4 grain (0.25 Gm.) tablets, a convenient size for use. The average dosage is about 7½ to 15 grains (0.5 to 1.0 Gm.) daily. This is given in one dose at bed time or early in the morning, or divided into two or three doses during the day. It is given by mouth. It is certainly desirable to administer this when the stomach is empty. Emetine hydrochloride by needle may be associated with this treatment. Stovarsol possesses the advantage over ipecac pills of being more easily swallowed and retained. It is less apt to cause gastro-intestinal disturbances. It is too soon yet to fix definitely its true value as a curative agent, but the clinical evidence so far tends to establish it as having particular merit.

When the diagnosis has been made, stovarsol may be begun at once, or better still the following plan may be employed:

First. A preliminary period of 5 or 6 days' treatment with 1 grain (0.06 Gm.) injections daily of emetine hydrochloride. This is to lessen the acute symptoms and permit at the same time a larger amount of nourishment than would be advisable when an amebicide is being given by mouth.

Second. Two 4 grain (0.25 Gm.) tablets of stovarsol by mouth and 1 grain emetine hydrochloride by needle daily for eight days. During this time careful dietary precautions are observed in preparation for the oral medication.

Third. The later (or follow-up) treatment may be well carried out by continuing the treatment with emetine and stovarsol one day each week for several weeks, at least until the clinical symptoms and repeated laboratory examinations indicate a cure. Even then relapses sometimes occur.

Toxicology of Stovarsol. This drug is not without an element of danger and many unfavorable reactions have been experienced. The most common are a violent gastro-intestinal disturbance and a skin eruption much resembling measles.

Other Medication. Many other drugs have been recommended and some probably have value. Among these are yatren (anayodin), emetine bismuth iodide, bismuth subnitrate, phenyl salicylate and arsphenamine.

Colon Irrigations. As the lesions are usually in the colon, it is possible to aid the ipecac treatment by the use of colon irrigations. Not only is the destruction of the amebae favored, but the healing of the ulcerated areas may be hastened.

Various agents have been suggested for these irrigations, but quinine probably meets the requirements better than anything else. A solution of thirty grains (2 Gm.) of quinine sulphate in one half gallon (2000 cc.) of water gives a solution of about one to one thousand. It should be used at body temperature and injected very slowly. The patient should be instructed to retain as much as possible for at least several minutes. If sufficient care is exercised, it is usually possible to retain the entire amount for the necessary time.

The quinine may be ordered as follows:

℞ or
Quininae Sulph., ʒv 20¦0
Ft. cht. no. x
Sig.—Use one in a half gallon of warm water.

Ulcers in the lower colon that can be exposed and reached may be benefited by an application of a solution of silver nitrate.

Surgery. Various surgical measures have been employed. Among these appendiscostomy with subsequent colon irrigation has been employed most often.

Convalescence.—Physically and nervously the patient is usually markedly subnormal, particularly in the chronic cases. All general measures tending to promote a state of well-being are of value. Modified outdoor recreation, properly directed indoor exercise, and sufficient rest and sleep, are among those factors that should receive attention. The diet is increased, but some continued care and general supervision is necessary. The patient should be instructed to report promptly any gastro-intestinal disturbances.

Complications.—While many complications have been reported such as perforation and brain or pulmonary abscesses, the only one commonly met with is hepatic infection. This is discussed under Hepatic Abscess. (See page 419.)

INTESTINAL PARASITES

TENIA (TAPEWORM)

General Statement.—This condition is probably more common than is usually realized. It is found in all classes of society, all races, and at almost any age. Any child who is given artificial feeding, especially meat juices, is a possible host. It is probable that more frequent investigation of intestinal contents would reveal the presence of parasites more often than is now suspected. It is to be regretted that a feces examination is not included in the routine laboratory investigation of all hospital patients.

Symptoms and Diagnosis.—There are no definite symptoms that are pathognomonic of the presence of these parasites. It is the popular expectation that the patient will be emaciated and anemic and, of course, there is a tendency to an impaired state of well-being, but on the other hand a fairly large percentage of those found infected are apparently in perfect health.

A very frequent symptom is abdominal pain. Often this is in the region of the appendix. I remember one case, particularly, where the infection was discovered only a few hours before an operation was to be performed for a supposed chronic appendicitis. An increase in the eosinophile count is the condition that probably attracts attention to this infection as much as anything else, with the single exception of the patient noticing the segments in the excreta. Any marked increase of the eosinophiles in the blood should certainly arouse suspicion of the presence of parasites, unless the condition can be otherwise accounted for. In quite a series of cases that have been under my care in the past, the eosinophile count ranged between ten and twenty percent.

The majority of patients seek medical aid because they have noticed the segments in the excreta and either recognize what the condition is or have their anxiety or suspicions aroused.

In the hands of an expert laboratory worker a diagnosis can often be made by finding the ova in the feces, but a negative report is not of absolute value. I had one case that was passing segments; I sent specimens of the feces to three laboratories, being careful only that the specimens contained no segments, and received a negative report from each laboratory, while subsequent treatment removed a large tapeworm.

When the patient gives a history of having passed what he believes might have been segments, and the laboratory fails to give positive information, an irritant purgative may be given and the patient instructed to look for and bring to the laboratory any suspicious material passed.

Treatment.—The number of agents that have at one time or another been recommended as teniafuges is almost limitless. Those, however, that have stood the test of time are pelletierine or its preparations and the oleoresin of aspidium (male fern).

Oleoresin of Aspidium.—This is a toxic agent and must be employed with proper precautions. When so used, however, it is about as safe as it is possible for a medicine of this character to be. It acts by coming in direct contact with the parasite and is non-toxic unless it is assimilated; therefore, every precaution should be taken to prevent its absorption. Particularly to be avoided in its use are alcohol and oils. In using this treatment, it is better for the physician to stay with the patient or at least have the patient under the immediate care of a properly instructed nurse.

It is desirable, to give the treatment in the early morning as the gastro-intestinal tract can then be better prepared and the patient under better observation. Some writers have contended that it was not an advantage, and some have felt that it was a disadvantage to use a preliminary purgative. It seems only logical to believe that as the drug is to act by coming into contact with the parasite that it will have a better chance to demonstrate its effect if the alimentary tract is comparatively empty of food material. It would certainly be safer from the standpoint of the possible presence of fats or other matter that might favor absorption of the drug. · A satisfactory way of prescribing is as follows:

℞		or	
Oleores, Aspidii,	ʒi	4	0
Chloroformi,	♏x		6
Glycerini,	q.s. f℥ss	15	0
M.			

Sig.—Give at 8 A.M. (Shake-label.)

℞		or	
Oleores. Aspidii,	ʒi	4	00
Olei Tiglii,	gtt. ij		13
Chloroformi,	♏x	0	60
Glycerini,	q.s. f℥ss	15	00
M.			

Sig.—Give at 9 A.M. (Shake-label.)

℞

		or	
Oleores. Aspidii,	ʒi	4	00
Olei Tiglii,	gtt. ij		13
Chloroformi,	♏x		60
Glycerini,	q.s. f℥ss	15	00

M.
Sig.—Use if second dose is vomited. (Shake-label.)

The patient has these prescriptions filled in advance, using the first and second prescriptions in their order and using the third only if the second dose is lost. It is rather awkward to have everything arranged for the treatment, and then the patient vomit the remedy and be unable to secure the necessary material to carry out the plan.

The following routine may seem unnecessarily elaborate, but it can be carried out easily, may be of some advantage, and certainly can do no harm:

Say, for example, that the treatment is to be given Sunday morning. The written instructions would be something like this:

Saturday. A light diet, the evening meal, at least, being free from fats.

Sunday. Nothing to eat or drink before the treatment except a small cup of black coffee, if desired.

7:00 A. M., purgative as epsom salts, seidlitz powder, or some purgative water (Decide on which and order that and the amount specifically).

8:00 A. M., First prescription.

9:00 A. M., Second prescription.

10:00 A. M., Large saline purgative as one ounce (30 Gm.) of magnesium sulphate, or a large dose of some purgative water (specify which).

11:00 A. M., Can have coffee without cream or milk, fruit juices, ginger ale.

12:00 M. or 1:00 P. M., May have coffee without cream, fruit juices, carbonated drinks, dry toast, jelly.

Evening meal: may have any of the preceding articles of diet, also gelatin (without cream), cooked cereals (without cream or butter,) and baked potatoes.

No alcohols, fats, or oils during the entire day.

Monday—A light diet, free from fats and alcoholics.

The patient should be instructed to collect, in a suitable vessel, all of the intestinal evacuations and this material should be thoroughly searched for the head of the parasite.

The patient, or family will often wish to see this as usually they know that it is necessary for permanent relief that the head be removed. It is better to instruct them as to the appearance of this head, or else some sceptical individual may fail to be convinced. They naturally expect that a worm twenty-five or thirty feet long should have a head of proportionate size and, when they are shown a little object, about the size of the head of a pin, they may be hard to convince unless their confidence in the physician is unbounded.

The practice of having patients collect the parasites from the material and send them to the laboratory is unsatisfactory, as very often there is so little of the neck attached to the head that it may be overlooked.

When the treatment is given in the home and the physician intends to do the investigating himself, he should have with him a pair of rubber gloves, some sponge forceps, and a large sheet of dark colored paper.

The matter to be investigated should be poured into a sifter and repeatedly washed, then the head of the parasite sought for. I have had my efforts rewarded after a search of two hours. The process is materially facilitated by transferring all suspected material to a dark colored paper.

The use of gloves and instruments in the handling of this material is not only for reasons of cleanliness and safety, but because the impression upon the family and patient is good. The parasites are extremely repulsive to most persons. I knew one case where the patient refused to take medicine that had been handled by the nurse because she knew of the nurse having made search for the head of a tapeworm without having on gloves.

As previously suggested, one of the greatest inconveniences in carrying out tapeworm treatment with this drug is the tendency to emesis. This is not as great in the use of male fern as it is with some other agents that have been used, but it occasionally happens that this medicine is rejected by the stomach. The attendants should be prepared for this, should be ready to apply ice cloths and to carry out any other measures that might tend to aid the patient in retaining the dose.

Toxicology of Aspidium. Aside from the tendency to nausea, there is a certain element of danger in using aspidium. Dock and Bass collected reports of ten thousand cases in which this drug was used. Fifty-six cases had more or less disastrous results. In the great majority of these, there was a history of the drug having been followed by castor oil and in the cases where a definite history of this could not be obtained, there was at least the probability that oil, or some other fat, might have been used. In my own experience, I have had one case of moderate toxic neuritis following this treatment. In this instance the patient, contrary to my instructions, took a glass of cream soon after the treatment.

Pelletierine.—Pelletierine is a mixture of the alkaloids of pomegranate bark. It is official in the form of the tannate. It has been extensively used as such, also in the form of proprietary remedies. These preparations seem to be relatively safe from toxic effects and they entail very little inconvenience, except a sense of dizziness and a marked tendency to nausea.

My experience with the official drug has been extremely unsatisfactory from the standpoint of results.

Some of the proprietary remedies, one in particular, seem to be fairly satisfactory but not as reliable as aspidium.

Another disadvantage is that in case of any toxic results, the physician would have a rather poor defense when he stated that he had used a patent medicine of unknown strength.

Other Agents. Many other drugs have been used in the treatment of this condition, but it is probably true that at the present time, we have nothing that is as well understood and that comes as near meeting all requirements as oleoresin of aspidium.

ASCARIS (ROUNDWORMS)

These parasites may be found in persons of all ages but are more common in children. They may produce no apparent results, or they may be the cause of faulty development, impaired nutrition, or even such serious consequences as a persistent tendency to convulsions.

Symptoms and Diagnosis.—There are no definite symptoms that will give a positive diagnosis, though the conditions, as suggested in the preceding paragraph, should lead one to suspect the presence of intestinal parasites and to make the proper investigation. The only positive diagnosis is established by finding the ova or the worms in the feces.

Treatment.—Many agents have been used with varying degrees of success. Among these should be mentioned the following:—

Santonin.—This has probably stood the test of time better than any other agent. It acts by coming in contact with the parasite; therefore two factors should be considered. One is to have the intestinal tract as empty as possible and the other is to give the drug under such conditions as to lessen the chance of its being absorbed.

It may be prescribed as follows:

(For a child four years old)

℞

		or	
Santonini (cryst.),	gr. j		06
Hydrarg. Chlor. Mitis,	gr. ij		13
Sucrosi,	gr. xx	1	30

M. ft. cht. (non trit.) no. ij
Sig.—Take at 7 and 8 A.M.

The tendency in the past has been to give this drug at night. I believe it is better to give in the morning for two reasons:

First, the intestinal tract will be better prepared at that time.

Second, the patient may be kept under closer observation for toxic symptoms.

Many cases of convulsions have been reported and it would certainly seem inadvisable to give a child a toxic drug of this character, put him to bed, and allow the family to turn out the lights and go to sleep. It can be given in the morning and the patient easily kept under observation.

The following routine may be followed:

Say, for example, that the remedy is to be given Sunday morning.

Saturday. A light diet, particularly the even meal. At bedtime a mild purgative, such as milk of magnesia.

Sunday. 7:00 A. M., one powder.

8:00 A. M., one powder.

9:00 A. M., castor oil.

10:00 A. M., light nourishment, such as fruit juice, strained broths, or boullion.

12:00 M., light lunch.

The rest of the day the patient may take normal meals.

About two hours after the oil, it is better to give a purgative enema, so as to favor the removal of any parasites that may still be in the colon.

It may be noted that crystals have been prescribed. This is to prevent the too rapid solution of the drug in the upper part of the digestive tract. The drug is very sparingly and slowly soluble in water and its efficiency depends largely on this quality.

Considerable discussion has often arisen as to the most desirable purgative to use following the drug. Clinically, castor oil has seemed to meet the requirements better than anything else.

Toxicology of Santonin. Sometimes the vision may be affected, the patient seeing everything tinged with yellow. The urine may be colored yellow or red. These effects are transient and do not seem to be of material importance. It is customary to tell the family of the possibility of these evidences so that they will not be alarmed. Personally, I have never noted a case with these effects.

As previously stated, many cases of convulsions have been reported in this treatment. In evaluating this data we should remember that one of the results of infection with these parasites is a tendency to convulsions and in the thousands of cases in which the drug has been used, it is possible that in some cases the convulsions noted were merely coincidental. It is certainly desirable, however, to have the patient under observation during the course of the treatment, as has been previously suggested.

Oil of Chenopodium.—This agent has been extensively used. It may be ordered as follows:

(For a child four years old)

℞		or
Olei Chenopodii,	♏x	|6
Olei Ricini,	q.s. f℥i	30|0
M.		

Sig.—Take a tablespoonful at 7 A.M.

Instructions should be given to take the second dose should the first be vomited.

The drug may be administered to children by drops to be taken on sugar, or to older patients in freshly filled capsules (adult dose about 1 to 1.5 cc. total). Some prefer to give it in two or more portions about an hour apart, but in any instance to be followed by castor oil or some other purgative. The drug is not without danger. The preparation of the patient, diet, etc., are carried out just as suggested in the preceding paragraphs discussing santonin.

Carbon tetrachloride is at the present time being rather extensively used. The average dose is from ½ to 1 fluidrachm (2 to 4 cc.). It is usually given in two or three divided doses at intervals of an hour or two. It should always be followed by an active purgative. The drug is not without danger, and alcoholics tend to increase this by favoring absorption. The preparation of the patient is the same as described for the treatment of tenia.

Thymol is used in the treatment of this condition very much as it is in the treatment of hook-worm (see page 513).

Phenyl Salicylate and many other drugs have been employed with more or less success.

OXYURIS (PIN WORMS)

These parasites may infect persons of all ages, though they are more commonly found in children.

One of the characteristic symptoms is an itching in the region of the anus. They may interfere with the comfort and well-being of the patient, particularly giving rise to nervous manifestations. The only positive evidence of their presence is obtained by an examination of the feces.

Treatment.—The treatment of this condition is rather discouraging, and very often after even the most painstaking efforts, the patient will still show infection. It has seemed desirable, at least in the beginning of treatment, to carry out the measures recommended for the treatment of ascaris, and then to continue the use of enemas. This plan may be open to criticism but it has seemed to have clinical advantages. It may be detailed as follows:

Treatment is started off with an initial dose of santonin, just as outlined in the preceding section on the treatment of ascaris, except that instead of using the simple purgative enemas, the colon is irrigated as thoroughly as possible with a 1:1000 solution of quinine sulphate. Once a week after this the patient is given a dose of castor oil early in the morning and at noon a colon irrigation of half gallon of the quinine solution (1 to 1000). This is kept up until two successive treatments have failed to show any of the parasites.

Quassia has been used for generations for preparing the colon irrigation. Its specific value is questionable. It is usually ordered as follows:

℞		or
Quininæ Sulph.,	ʒss	2|0
Quassiæ,	℥i	30|0
M.		

Sig.—Use to make an infusion as directed.

This material is put in a vessel one-half gallon of hot water is poured on; it is covered and set aside until it is cool enough to use, then strained.

This is repeated once a week until two or more treatments have failed to show the presence of the parasites.

Enemas of kerosene oil have been extensively employed with good results.

If there is much rectal irritation, small enemas of olive oil, castor oil, or melted petrolatum will give relief.

UNCINARIASIS (HOOKWORM DISEASE)

General Statement.—Hookworm infection is probably more prevalent than is generally recognized by the average physician. It affects any age, class, or race, but is naturally more common among those who are most exposed to the infection.

It is found principally between the thirtieth degree north latitude and the thirtieth degree south latitude, with a tendency to less infection in the higher altitudes. Persons living within this area or who have lived there, particularly if residing in the country and more particularly if they are of the poorer classes who have necessarily been subjected to unfavorable hygienic conditions, should always be suspected of being infected. In other words, in the sections of the country in which this condition is endemic, it has a place in diagnosis with syphilis, tuberculosis and malaria, in that it is always a possibility.

Symptoms and Diagnosis.—A history of exposure to the known avenue of infection is always of value in establishing the diagnosis. In the process of infection there are, in many cases, cutaneous lesions commonly known by the laity as "ground itch," a history of which is of the greatest value. A negative statement in this respect, however, is not of very material value in excluding the disease. The evidences of infection may cover a wide range. It is not unusual for the process to lead to complete disability or death. By far the most common cases are those in which only a certain amount of inconvenience is entailed.

State of Nutrition and Development. Emaciation may be extreme, but in the majority of cases there is a tendency only to a lowered state of nutrition. Where the infection occurred early, there may be faulty or retarded development.

Anemia is a fairly characteristic sign and may reach an extreme degree. In the majority of cases there is some blood impoverishment. This is shown not only by the blood examination, but may be evidenced by the color of the skin, and particularly of the mucous membranes.

Edema. This is a frequent symptom in severe infections. It should be borne in mind, however, that a large number of individuals who are walking around suffering from a general impairment may not show evidences such as edema, and such extreme symptoms should not be necessary to call our attention to the possibility of this disease.

Loss of Vitality. There is a marked tendency to impaired efficiency, both physical and mental. In a severe infection the weakness may be extreme, and the mental processes markedly interfered with.

Laboratory. An absolute diagnosis is established only by finding the ova or the parasites in the feces. Fortunately they may be demonstrated with a fair degree of certainty by a careful examination.

Not only does the blood show a secondary anemia but there is a marked tendency to an increased eosinophile percentage, which may range from five to fifteen or even more.

Prophylaxis.—The only absolute prophylactic measure, and one that would meet all requirements, is the proper disposal of excreta. Next in importance is the elimination of the source of soil pollution by curing infected individuals. This matter has of late years received so much attention and is so generally appreciated that a detailed discussion here is hardly indicated.

Treatment. General Care. This will depend upon the condition of the patient. The great majority of cases as seen in general practice require only the removal of the parasites followed by attention to diet, rest, recreation and such other measures of proper living as are usually considered in restoring a convalescent to normal.

Medication.—Many agents have been suggested from time to time and most of these have value. The one that has been most extensively used is thymol; next are carbon tetrachloride and the oil of chenopodium.

Thymol.—This drug has been in use for many years, but it is only within comparatively recent times that it has been employed in the massive doses such as are now used in the treatment for hookworm. It is a poisonous substance and the safety of the large dose depends on its limited solubility and on the carrying out of those necessary measures that will lessen the chance of its being absorbed. It is very sparingly soluble in water, freely soluble in oils and in alcohol; therefore all alcoholics and fats must be eliminated from the patient's diet during the period of treatment.

The following are some prescriptions showing how the drug may be ordered for an adult:

℞		or
Thymolis,	gr. l	3|3
Lactosi.	gr. x	|6
M. ft. cap. no. x		
Sig.—Five (5) at 8 and five (5) at 9 A.M.		

℞		or
Thymolis Pulv.,	gr. l	3|3
Muc. Acaciæ,	f℥ss	15|0
Syr. Tolu,	q.s. f℥j	30|0
M.		
Sig.—Tablespoonful at 8 and 9 A.M.		

The sugar of milk is employed in capsules in order to facilitate the disintegration of the drug mass after the capsule itself has been dissolved.

In arranging for treatment all instructions should be written. The following will illustrate. This is based on the drug being administered on Sunday.

Saturday. The patient may eat such food as tea and coffee (without cream), carbonated drinks (such as root beer and ginger ale), cereals (without cream or butter), dry toast, baked potatoes, skimmed milk, buttermilk (from which all of the butter has been removed), and fruit. After 6:00 P.M. nothing but water to be taken.

Sunday. Upon awaking the patient may have a cup of black coffee, without cream.

7:00 A.M. A saline purgative, as a large dose of magnesium sulphate, or some purgative water. (The particular drug and the dose should be specified.)

8:00 A.M. Half of the thymol prescription.

9:00 A.M. The other half of the thymol prescription.

10:00 A.M. Repeat the saline purgative.

12:00 M. If the last purgative has acted well, the patient may have coffee or tea (without cream), ginger ale and fruit juices.

3:00 P.M. May have some of the previously mentioned articles of food, also dry soda crackers.

For the evening meal, add cereals (without cream) and baked potatoes.

Monday. Diet the same as Saturday.

It is often not only advisable to specify what the patient may eat but to emphasize in addition to this that the patient cannot have "oils, fats, greases or alcoholics." It is very common for some to try to reinforce themselves for the ordeal by taking a drink, and particularly in the case of children for the family to give some proprietary, as Ducro's Elixir, containing alcohol. This should be prohibited.

The material passed during the period of treatment should be washed in a fine sieve or cloth strainer and the parasites searched for.

This treatment does not have a hundred per cent of efficiency and it is often necessary to repeat at intervals of about one or two weeks until the patient has been demonstrated to be free from the parasites.

Oil of Chenopodium.—This is a valuable preparation and some authorities have rated it as possessing a higher percentage of efficiency than thymol. The drug is best given in capsules. The adult dose is about 1.5 cc. The preparation of the patient, diet, and other routine may be carried out just as in the thymol treatment.

Carbon Tetrachloride.—This is now being extensively employed and seems to possess a high degree of efficiency. It is not without danger and children and alcoholic subjects seem to be particularly affected. The usual dose is from 1 to 3 cc., preferably given in two or three portions. The preparation of the patient including diet, is the same as for thymol, except the amount of the final purgatives, as this drug itself is laxative.

As these agents all act by coming in direct contact with the parasites, a proper preparation of the digestive tract not only limits the danger from absorption of the medication but increases the chance of the drugs reaching the parasite to exercise its vermicidal action.

After-care of the Patient.—Often after the parasites have been removed, the patient is still far from being in a normal condition, and it is certainly desirable to use those measures that favor a prompt return to a state of good health. These will include the administration of iron and arsenic, proper attention to a highly nutritious diet, and the institution of a proper balance between rest, recreation, and work.

DISEASES OF METABOLISM AND NUTRITION

DIABETES

General Statement. Definition.—Probably the best definition of diabetes is that of Rosenthal, who states "it is a condition characterized by an excess of sugar in the blood and by a constant output of glucose in the urine, on a normal carbohydrate intake." This definition is admittedly unsatisfactory in that it fails to include many important considerations. Various subdivisions have at times been recognized. For example, cases are classified as mild, moderately severe, and severe, also as acute and chronic.

Incidence.—No class is immune. While it may occur at any age, it is most common in the fourth, fifth and sixth decades. It is less frequent in early life and extreme old age. It is more often found among the well-to-do than among the poor; among the brain workers than those employed in physical labor, among men than women. The Hebrew seems to be particularly susceptible. It is more common in certain localities than in others.

Etiology.—There is still much mystery relative to the cause of the disease. From time to time theories have been advanced and then abandoned. There seem, however, to be certain factors that more or less certainly play a part. Among these are the following:

Heredity. There is an hereditary predisposition to diabetes.

Obesity. The exact role of obesity is still obscure. Diabetes does develop more frequently, however, in this type of individual.

Sustained mental strain, or profound emotion.

Trauma. This may act largely through the emotional disturbance.

Acute infectious diseases.

Endocrine disturbances, particularly of the thyroid and hypophysis.

Nephritis. This may play a part, though it is considered by many as more probable that it is an associated condition from a common cause or the result of the diabetes.

Pancreatic Diseases. Naturally if the process involves the Islands of Langerhans, sugar metabolism will be disturbed.

Course and Prognosis.—While the acute type of the disease is known, as a rule it is usually a slow process, running through many years. Much depends upon the age of the individual. Beginning late in life, it is more apt to run a benign course than when it develops early. Another factor of marked importance in prognosis is the extent to which the patient can lend himself to treatment. The general health of the individual must also be considered. The whole matter of prognosis has recently been materially changed by the introduction of insulin. At the present time it is too early to formulate any definite idea as to the life expectancy of those patients who have the advantage of modern treatment, including the use of this agent.

Symptoms and Diagnosis.—As a rule diabetes is discovered through the examination of the urine for other causes, when the presence of the disease was not suspected. It is well to bear in mind, however, some of the symptoms that should lead one to suspect the presence of this disease, or those that may be encountered during the course of its treatment. Even the patient who is known to have diabetes should have the benefit of close and repeated examinations, not only to establish the organic and functional status from the standpoint of this condition, but to discover and eliminate any other factor that might interfere with well-being.

Every case should have the benefit of a thorough, detailed history. This should include particularly an investigation of everything that might indicate when the diabetes began.

The onset as a rule is gradual. Usually among the first symptoms calling attention to disturbed health are polyuria, excessive thirst, increased appetite, and loss of weight and of physical efficiency.

Pruritus, particularly pruritus vulvæ, or less commonly balanitis in the male, may be the first suggestive symptom. Polyuria is often that which calls attention to the disease. All cases of polyuria should be given the benefit of repeated urinalyses. As the disease progresses there is naturally a tendency to dehydration and dry skin. There is often dryness of the mouth, with an involvement of the mucous membranes, particularly of the gums. Constipation is rather the rule. Late in the disease there may be edema. Impairment of vision while not constant is found at times as a late symptom.

Various nervous phenomena may develop, such as loss of mental efficiency, irritability, insomnia, drowsiness, impaired knee jerks, neuralgic pains, and certain types of paralysis. There may be trophic manifestations and even more or less extensive ulceration.

There are no constant circulatory phenomena, but there is a tendency to rapid pulse, disturbed blood pressure, and the development of arteriosclerosis. There is also a tendency to local infections, furunculosis and gangrene.

Acidosis and other conditions that might be regarded as complications will be discussed later.

Laboratory. It is here that the diagnosis can usually be made with ease and certainty. The urine on a normal carbohydrate intake shows a constant or relatively constant glucose content; this may vary from the slightest trace to large amounts. Sugar may not be present in every specimen voided, so it is important that the twenty-four hour urine be used for investigation. This, of course, is essential when the per cent and daily total of sugar is sought. The specimen should be collected in a well stoppered container and preserved by the addition of some agent that will not interfere with urinalysis, 10 grains (0.6 Gm.) of menthol answers well. The urine is usually increased in volume and in specific gravity. There is a decided tendency to albumen, acetone, and diacetic acid.

The blood shows an increase in the sugar content. It will be remembered that the normal blood sugar is from about .07 to .12 per cent. (70 to 120 milligrammes of sugar in each 100 cc. of blood). In diabetes this may be several times greater.

There are other special avenues of investigation that may give information of value; such, for example, as the glucose tolerance test and the carbon dioxide tension of the blood and alveolar air.

Differential Diagnosis.—There is little chance of confusion here, as there are few conditions that might be mistaken for diabetes if the simple routine investigation is followed.

Renal glycosuria may be eliminated by the blood sugar examination and the presence of the other evidences of the disease.

Prophylaxis.—There is little definite that can be offered in the way of prophylactic measures. Joslin and others stress the importance of combatting adiposity by proper attention to diet and exercises. Those families with a tendency to diabetes should not only avoid overweight but be conservative in the use of carbohydrates.

Treatment. Special Considerations.—This section is for the benefit of those physicians who must treat some cases of diabetes without the aid of all desirable facilities.

There can be no question of the fact that in the treatment of diabetes the ideal is to have the patient in a hospital and give him all the benefits of close observation, scientific dietetics and unlimited laboratory investigation. Unfortunately the majority of physicians must work without these aids and the majority of patients cannot or will not avail themselves of such facilities. It is sometimes difficult for the internist in the medical center to realize this as there comes to him principally the late cases, where the disease is well established, and the patient resigned to any measures. The family physician practicing under average conditions can divide those coming to him with glycosuria, into the following groups for treatment.

1. Those who are relieved promptly and completely by merely omitting sugars from the diet. The order for this may be written as follows: "Omit all sugar and other sweets (as sugar, candy, cake, syrup, honey, jelly, preserves and pie)."

2. Those who in addition to the above restriction require a reduction of weight to normal. This usually can be accomplished by adding to the order omitting sugars the following temporary restriction: "Omit fats (as butter, cream, bacon and olive oil). No large meals." Control of the weight reduction should be maintained by weighing the patient once a week and changing the orders as indicated.

3. Those who in addition to reducing the weight to normal and omitting sugars require a restriction of other carbohydrates. This may be accomplished by giving the patient a food list and checking off

the items that he may have, such as the carbohydrate-poor vegetables and fruits, most of the meats, eggs, oysters and fats. These lists can be purchased or are supplied free by some of the manufacturing houses. The diet should be changed in quality or quantity as indicated by the results of urinalysis and by the patient's gain or loss in weight.

4. Those for whom at least a period of hospitalization and continued intensive supervision is a necessity.

Regular Treatment.—This may be considered under four heads: General care, diet, the use of insulin and the management of emergencies and complications.

General Care.—In any phase of treatment, in any type of case, a certain amount of intelligent cooperation on the part of the patient and others concerned is essential. As someone has suggested, nothing is more discouraging than trying to care for a stubborn or ignorant diabetic. It is essential that these persons be given a thorough understanding of some of the facts relating to their condition and the treatment, such as the character of the disease and its usual course; the various phases of general care; the necessary principles of dietetics; and such special measures, if indicated, as simple urine examinations for sugar and the administration of insulin. They should be trained especially in keeping proper records.

The question that must be considered at the beginning of treatment is whether the patient can or must be treated in an institution, at least for a reasonable period. Where good hospital facilities are available it is certainly the ideal arrangement for the time during which the condition of the patient is being investigated, the dietetic possibilities established, and education in the proper manner of living carried out. The duration of the stay in an institution will depend upon such factors as the severity of the case, the response to treatment, and the financial status of the individual.

Rest, both mental and physical, is one of the most important considerations. The degree of restriction necessary will depend upon the condition of the patient. During the preliminary treatment, when the sugar tolerance is being established and the disease brought under control, absolute rest in bed is desirable, particularly in severe cases. This should be followed in favorable cases by modified activity and recreation, and, under the present plan of management, the majority of patients can return to at least a reasonable amount of work. Outdoor recreation is universally recommended as a valuable part of the plan of treatment. This should not be carried to the point of exhaustion and should not involve nervous strain. The same should apply as far as practicable to occupation.

Proper attention should be given to the care of the mouth, to body cleanliness, to proper warmth and ventilation of living quarters, proper clothing, and all measures that promote general health and well-being.

The medical supervision should include the entire manner of living of the individual. Vicious habits particularly should be prohibited, and this would include all forms of dissipation. Patients should be given to understand in the beginning that their life expectancy depends almost entirely upon themselves.

Diet.—It should be recognized that the old principles of dietetic management still largely obtain, though even this phase of treatment has been modified by the introduction of insulin. This is particularly true in the severer types of the disease.

Lowered State of Nutrition. The greater the body weight, the more food required to carry out the various processes of life. It stands to reason, therefore, that unnecessary body material, such as fat, should be curtailed. Reduction should not be carried to an extreme. A fairly low level can be found that is consistent with a state of well-being and yet the body be free from superflous tissue.

Food Requirements. The caloric requirements of an individual are estimated principally from the weight, and may be safely placed, for one at comparative rest, at from 25 to 30 calories per kilo of body weight. This refers, of course, to a permanent diet and can be safely reduced for considerable periods of time. When the individual is taking active exercise, the caloric requirements are, of course, increased. Children also require more.

The food requirements are supplied from the carbohydrate, protein, and fat intake in about the following amounts:

Carbohydrates	4 calories per Gramme
Proteins	4 calories per Gramme
Fats	9 calories per Gramme

There are some primary considerations that have to be borne in mind. A certain amount of protein is necessary to meet the demand resulting from waste and for the purpose of building this type of structure in the body. This daily requirement may be roughly estimated at from two-thirds to one Gramme per kilo of body weight. One Gramme is probably the safer estimate. Children need more than this.

The amount of fat required for the well balanced diet in the average case is about 2½ Grammes per day per kilo of body weight. Children require less. The proportion of fat to other food materials is usually relatively unimportant if the patient is taking a fairly low total diet.

The result of the body chemistry of the three types of food is as follows:

Carbohydrates are handled as such.

Proteids. 58 per cent as possible carbohydrates, 46 per cent as possible fatty acids.

Fats. about 10 per cent as carbohydrates and 90 per cent as fatty acids.

Therefore, in calculating the total food intake it must be on this basis.

Another important factor is that fatty acids are handled in the body through the combustion of glucose, or as has been said, "the fatty acids burn in the flame of the carbohydrates." The retention of excessive amounts of fatty acids or ketone bodies, as they are often called, leads to the condition known as acidosis, which will be discussed later. This is one of the considerations which makes it so essential to follow the treatment with frequent laboratory investigations, including, not only urinalyses, but blood chemistry also.

The dietary outline as suggested in the literature of Eli Lilly & Company has many points in its favor. It is somewhat as follows:

The ideal daily intake per kilo of body weight that is desirable for a patient at rest is estimated as 30 calories. This to be made up of one Gramme of protein, two and one-half Grammes of fat, and the balance supplied by carbohydrates. For example, a 50 kilo patient would receive 50 Grammes of protein, 125 Grammes of Fat and the balance in carbohydrates. This amount of proteids would supply 200 calories (50 × 4 = 200) and the fat would supply 1125 calories (125 × 9 = 1125), totaling 1325 calories. As the total requirement is 1500 calories (50 × 30 = 1500) there would be 175 calories (1500 − 1325 = 175) to be made up by carbohydrates, or about 44 Grammes (175 ÷ 4 = 44).

The ultimate results of the body chemistry of this diet may be calculated as follows:

100 per cent, of 44 Gm. of carbohydrates = 44 Gm. carbohydrates.
58 per cent, of 50 Gm. of proteins = 29 Gm. carbohydrates.
46 per cent, of 50 Gm. of proteins = 23 Gm. of fatty acids.
10 per cent, of 125 Gm. of fat = 12½ Gm. of carbohydrates.
90 per cent, of 125 Gm. of fat = 112½ Gm. of fatty acids.

It has been previously stated that the proportion of total glucose to total fatty acids is important. In the preceding paragraph it will be noted that there is a total possible glucose of 85.5 Gm., and a total possible fatty acids of 135.5 Gm. which would give a glucose-fatty acid ratio of about 1 to 1.6. This may be considered as being well within safe limits, as 1 Gm. of glucose in its ultimate body chemistry can take care of from 1½ to 2½ Gm. of fatty acids.

In a general way it has been said that there are four principal considerations in the matter of dietetic treatment

First. A reduction of carbohydrates.

Second. A reduction of the total diet.

Third. Such control of the fat intake as to get the proper fatty acid-glucose ratio.

Fourth. A sufficient protein intake to meet body requirements.

There are three principal types of diet that at the present time have their advocates:

First. The general low diet.

Second. The low carbohydrate diet.

Third. The high fat diet.

Carbohydrate Tolerance. In estimating the ability to handle carbohydrates many plans have been suggested, among which there are three of particular importance:

First. It may be roughly estimated by a quantitative examination of the total twenty-four hour urine when the patient is on a known carbohydrate intake, the difference between the output and intake showing the sugar tolerance of the individual that is the amount of sugar his body is using.

Second. Reducing the carbohydrate intake (the glucose from proteins and fats must also be taken into consideration) until the urine is sugar-free; the amount of intake at that time indicates the amount the patient can handle.

Third. Starvation until the urine is sugar free, then gradually building up the diet until sugar appears in the urine, the carbohydrate intake at that time indicating the sugar tolerance.

It should be borne in mind at all times that the patient may develop an increased sugar tolerance.

Which Patients Should Be Kept Sugar Free. In the case of children, it is particularly desirable to keep the urine normal to avoid unnecessary demands upon the glucose function and allow for the proper development that is naturally essential. In some chronic cases, particularly in the aged, it may not at times be found advisable to try to arbitrarily avoid all trace of glycosuria as the results may not justify the rigorous methods necessary. This would apply especially to patients that do not show appreciable impairment of health or body functions.

Routine Measures. During the period of preliminary investigation, the patient should be weighed every day. Later this may be less frequent, but a weight chart should always be kept. The urine should be tested for sugar and ketone bodies every day till progress has been sufficiently established, then the intervals between examinations may be gradually widened. The twenty-four hour specimen should be used except when several tests are being made daily. When possible the blood sugar should be determined at sufficiently frequent intervals to supply the necessary information. At first about once every two days usually meets the requirements. As the case progresses favorably and the relation of blood sugar to urine sugar has been established, the blood examinations may be made only at infrequent intervals.

When the patient is being treated at his home he should have proper scales, urine testing outfit, and the necessary literature.

The diabetic specialist to a large extent sees the patients that have failed to respond to simple measures and where the disease is fairly well advanced. Most of these require rigid restrictions, hospital care and insulin. On the other hand, the general practitioner finds that a very large percentage of his cases promptly go to normal by proper weight reduction, proper living, and moderate dietetic restrictions. The mild case should be given the benefit of this test before being condemned to the burden of the full plan of intensive treatment.

Ordering Diet. The physician should write the order for a definite number of Grammes of the three types of food as C 44 – P 50 – F 125, and may change this from time to time as indicated.

Diet List. At the close of this chapter (p. 528) will be found some detailed lists taken from my service at the Charity Hospital which illustrate the working out of orders as suggested in the preceding paragraph. There is included also a list showing the carbohydrate, protein and fat content of the common foods.

Insulin.—This agent is of such importance in the management of diabetes that it demands consideration in some detail. This is a product prepared from the Islands of Langerhans of the pancreas. It is the discovery of Banting and Best, who did their research work in the laboratory of McLeod in the University of Toronto. It was first manufactured and marketed in this country by Eli Lilly and Company and now by many others.

Unit. Several changes have been made in the original plan of standardization and now the unit is a little less than one-half of the amount required to reduce the blood sugar of a starving two kilogramme rabbit to 45 mg. per 100 cc. of blood and produce convulsions in from three to five hours.

Action. The action of insulin is not entirely understood in all its details at this time. We do know that it brings about the normal metabolism of sugar. In this way it indirectly results in the handling of fatty acids also. This action begins about fifteen to thirty minutes after injection, reaching the maximum in about three or four hours, and probably lasts from six to twelve hours. This varies of course in different individuals. It may be roughly stated that one unit of insulin will result in the proper metabolism of about two Grammes of glucose, although this varies considerably in different individuals. There also seems to be considerable variation depending upon the size of the dose, that is, in many cases the small dose seems to accomplish more per unit than larger doses.

How Administered. It is used exclusively by injection. Under ordinary circumstances this injection is made subcutaneously, care being taken to place it well into the subcutaneous tissue and not in the muscles or skin. The location of these injections should depend largely upon the convenience of the individual; the arm is the usual choice. The site of the injections should be varied so as to avoid induration with its discomfort and interference with absorption.

When Given. This varies considerably with different clinicians and depends to a large extent upon the individual case. As a general rule about fifteen to thirty minutes before meals seems to meet the requirements best. The number of doses per day depends upon the requirements of the particular case. The Mayo Clinic finds that a large per cent of the patients are best served by two injections, one given before breakfast and one at three P.M. One advantage of this is that if hypoglycemia develops, it does so during that period of time when the patient is under close observation.

The following plan has been suggested by Barborka: When 15 units, or less, are required, it may be given in one dose before breakfast. When 15 to 30 units are required, it may be given to advantage in two doses. When more than 30 units are required it may usually be given to best advantage in three doses. There are some general principles that uniformly apply: The larger doses should be given before those meals that contain the most carbohydrates. The largest dose is best given in the morning. Every case should be individualized, and where one plan of administration does not meet the requirements, some other should be tried.

Cases Requiring Insulin. As previously suggested the majority of patients seen in the early stages of diabetes respond to simple measures of treatment. Those cases that fail to progress favorably under general care and proper diet should have the benefit of insulin. The hope should always be entertained that they will reach the stage when it can be gradually discontinued. Insulin is particularly indicated in certain emergencies such as with infectious diseases and in surgical necessity.

For beginning the use of insulin, four general plans are at present being advocated. In all of these it is highly essential that repeated laboratory examinations be made.

First. Estimate the ideal food requirement based on weight, age, and state of nutrition, and put the patient on this diet. Then begin with small doses of insulin and gradually increase (the diet remaining stationary) till the blood sugar is normal and the urine sugar-free.

Second. Estimate the sugar tolerance by placing the patient on a known carbohydrate intake and determine the amount of glucose eliminated by quantitative analysis. Then begin the use of insulin by injecting about one unit for every two Grammes of glucose excreted, gradually increasing or diminishing the dosage until desired effect is obtained.

Third. First render the urine sugar free and the blood normal (if possible) by starting on a limited carbohydrate intake (or starvation), then gradually increase the diet until glycosuria develops, when the use of insulin is begun. The diet is then gradually increased, keeping the proportions of about one of carbohydrates to two of fats. The insulin is increased at the same time sufficiently to meet the requirements as estimated from repeated laboratory investigations. This insulin increase will usually be about one unit for each two Grammes of carbohydrates.

Fourth. Let the patient begin with a diet such as would be considered ideal under normal conditions. Begin at the same time with small doses of insulin, gradually reducing the diet and increasing the insulin, until the middle point is reached at which the glucose is properly handled. The diet and insulin are then increased "stepwise," till a proper maintenance diet is being given.

In any of these plans the patient must be under close observation. It should always be remembered that there may be an increase in the sugar tolerance which calls for a corresponding reduction of the insulin or increase of carbohydrates.

In those cases that require the continued use of insulin and who do not have a trained attendant, it is usually necessary to teach the patient or some member of his household to give the injections. They should be well schooled in asepsis and in the matter of checking results and watching for danger signals.

Some Special Considerations. There are certain factors that may materially influence the course of the disease and therefore the treatment.

Mental State. Anxiety, shock, sustained mental effort, or kindred conditions may materially impair the sugar function and require more insulin or less carbohydrates in the diet. It must be remembered here that the amount of insulin required under these conditions may have to be reduced when a more normal state of living returns.

Infections. All acute febrile diseases impair sugar tolerance and require an increase in insulin or reduction in diet. Here again one must reduce the insulin on the return to normal.

Surgery. Insulin has been found of particular value in preparing diabetic patients for safe surgical procedures which before were fraught with much hazard. It also lessens the dietetic problems of after-treatment.

Hypoglycemia.*—It will be remembered that normal blood sugar is from about .07 to .12 per cent (70 to 120 milligrammes per 100 cc. of blood), usually nearer the upper limits of this scale. Hypoglycemia is the condition where there is a reduction in blood sugar below this minimum amount. Previously this was an unusual condition; now it is not infrequent as a result of insulin treatment, particularly where the case is not under direct control.

Among the most common causes that are operative in the production of this condition may be mentioned:

Miscalculation as to the amount of insulin required.

Several doses given in too rapid succession without sufficient carbohydrates.

A dose given in anticipation of a meal which is delayed or vomited, or for any cause not digested and assimilated.

Exercise which has increased glucose utilization and tolerance without a corresponding reduction in isulin being made.

Symptoms and Diagnosis of Hypoglycemia.

First. Sudden and pronounced hunger.

Sudden weakness or fatigue.

A peculiar restlessness or nervousness, often described by the patient as a feeling of "inward trembling," or the "shakes."

Pallor or flushing of the face; dilated pupils.

Increased pulse rate (of diagnostic value in children).

These early symptoms appear usually in 1 to 5 hours following injection and may be made to disappear quickly and further danger be avoided, if the patient will immediately eat a little carbohydrate food such as one or two lumps of sugar or candy, the juice of an orange, half a glass of milk, or a tablespoonful of syrup.

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* Particular acknowledgment is made to Eli Lilly and Company for this discussion of hypoglycemia.

If the overdose is sufficiently large and the above corrective measures are not adopted, then the following train of symptoms, all or in part, will follow:

Second. Sweating. (This is the most characteristic symptom.)
Tremor and incoordination of muscles.
Anxiety, fear, apprehension, excitement, and emotional disturbance.
Vertigo.
Diplopia.
Third. Aphasia, disorientation, delirium, confusion.
Fourth. Convulsions, collapse.
Low blood pressure; low body temperature.
Unconsciousness.
Fifth. Exitus lethalis.

Treatment of Hypoglycemia. This would naturally consist in the administration of sufficient carbohydrate. As a rule such may be given by mouth either in the form of glucose or a sufficient amount of orange juice or syrup. Corn syrup is particularly desirable. This should be given in amounts of about ½ fluidounce (15 cc.) repeated every 15 minutes depending upon the requirements. When the case is urgent, glucose should be given intravenously. The ampules of glucose ready for administration are now on the market. The response is usually prompt and satisfactory. In the majority of cases within a few hours the patient seems none the worse for the experience.

Acidosis.—This is a condition resulting from an accumulation of an excessive amount of fatty acids in the blood, these susbtances being frequently spoken of as acetone or ketone bodies. The name ketosis is sometimes used synonymously with acidosis but is also used to designate a condition that is characterized only by the elimination of these bodies in the urine without the development of symptoms. The cause is, of course, an excessive intake of fatty acid producing food (proteins and fats) or a utilization of the body substance producing these ketone bodies, which, in the absence of the proper metabolism of glucose, are not broken down and therefore accumulate. This etiology would naturally indicate that the treatment is to provide for the metabolism of glucose in the body which results in the elimination of these fatty acids.

Among the early symptoms are nervousness, irritability, restlessness, drowsiness, and mental impairment. Dyspnea, particularly a deepening of the respiratory cycle without increasing the respiratory rate is fairly characteristic. The later stages include such symptoms as increased dyspnea, dehydration, dry mouth, and coma.

Laboratory Findings. The determination of the carbon dioxide combining value of the blood plasma and of ketone bodies in the urine naturally gives much information of value.

During the stage of treatment of acidosis, it is not desirable to try to keep the urine sugar free. Attention at this time should be concentrated upon the elimination of those substances that are directly responsible for the existing condition.

Treatment of Acidosis. The main objective in treatment is to bring about a reduction in the accumulated toxic material (fatty acids) and it should be remembered that this is effected mainly through the metabolism of sugar. Fortunately we are now able to do much that until recent years was impossible. The urgency of the measures adopted must depend upon the condition of the patient. An immediate hypodermic of insulin (20 to 40 units) should be given, and if the case is very urgent, about half of this amount should be administered intravenously. Unless certain that sufficient hyperglycemia is present, sufficient sugar must be given even with this preliminary dose of insulin. The sugar may be administered in any convenient form,—by mouth or as glucose intravenously, depending on whether the insulin be given by the hypodermic or intravenous method. If at all possible, specimens of blood and urine should be immediately examined. The urine at least can always be tested promptly and this should be done every hour to two throughout the stage of intensive treatment. Following the preliminary injection of insulin, treatment is guided to a large extent by the laboratory findings. Further injections of insulin are usually indicated every two or three hours. From ten to twenty units are used for each dose buffeted with sufficient carbohydrate, under ordinary conditions about one or two Grammes of sugar to every unit of insulin. The sugar may be given by mouth in the form of fruit juices, corn syrup, or glucose, except in extreme cases as of coma, when glucose should be given intravenously. It is used in solutions of from ten to 50 per cent. When the intravenous route is not available, the next most satisfactory in urgent cases is by hypodermoclysis. In this method solutions of from three to five per cent are used.

Care should be exercised that the blood sugar be not too much reduced and the patient go from the coma of acidosis into that of hypoglycemia.

It cannot be stressed too much that these cases are much better handled in a hospital, and that careful clinical observation and laboratory findings are necessary in guiding the treatment.

The patient should have the benefit of those well known measures that have been proven of value in the past, such as absolute rest in bed, body warmth, large fluid intake, and intestinal elimination. Many give alkalies, particularly sodium bicarbonate, until the urine is alkaline.

Complications.—Such conditions as furunculosis, pruritus and gangrene, are treated by rendering the urine sugar free, bringing the blood sugar within normal limits and treating the local conditions symptomatically.

Specimen Sheet Illustrating How the Diet Laboratory Works up the Physician's Simple Order (as C25, P50, F125)

CHARITY HOSPITAL

Diet Laboratory

Name John White Ward 20 Bed 16 Service Med. No. 2

Food	Quantity	24 Hour Carbo.	Diet in Prot.	Grams Fat.
		25	50	125
Cream, 20 per cent	180 cc.	6	6	36
Oatmeal (Dry wt.)	15 gm.	10	2	1
Vegetables, 5 per cent	270 gm.	9	4	0
Meat (Uncooked, lean)	100 gm.	0	20	10
Eggs No. 3	90 gm.	0	12	9
Bacon (Uncooked)	60 gm.	0	6	36
Butter	40 gm.	0	0	33
		25	50	125
		4	4	9
		100	200	1125
				200
				100
Total Calories				1425

			Carbo. Grams
Cream, 20 per cent	180 cc.	Breakfast	16
Oatmeal	15 gm.		
Egg No. 1	30 gm.		
Bacon	15 gm.		
Vegetables, 5 per cent	150 gm.	Dinner	5
Meat	100 gm.		
Butter	25 gm.		
Bacon	30 gm.		
Vegetables, 5 per cent	120 gm.	Supper	4
Egg No. 2	60 gm.		
Bacon	15 gm.		
Butter	15 gm.		
Total			25

N. B.

Water, clear broth, coffee and tea (without sugar or milk) Ad lib. *if permitted.*

All foods *served or refused* must be recorded in detail of weight or quantity.

Diet to begin——————————

CHARITY HOSPITAL

Diet Laboratory

Name James Brown Ward 20 Bed 14 Service Med. No. 2

Food	Quantity	24 Hour Carbo.	Diet in Prot.	Grams. Fat.
		44	50	125
Cream, 20 per cent	180 cc.	6	6	36
Shredded Wheat No. ½	15 gm.	12	2	0
Vegetables, 5 per cent	300 gm.	10	5	0
Vegetables, 10 per cent	60 gm.	4	1	0
Potato	60 gm.	12	2	0
Eggs No. 2	60 gm.	0	8	6
Bacon	30 gm.	0	3	18
Meat (Uncooked, lean)	115 gm.	0	23	11.5
Butter	64 gm.	0	0	53.5
		44	50	125
		4	4	9
		176	200	1125
				200
				176
Total Calories				1501

Food	Quantity	Meal	*Carbo. Grams*
Cream, 20 per cent	180 cc.	Breakfast	18
Shredded Wheat No. ½	15 gm.		
Egg No. 1	30 gm.		
Bacon	15 gm.		
Vegetables, 5 per cent	150 gm.	Dinner	9
Vegetables, 10 per cent	60 gm.		
Meat	115 gm.		
Butter	40 gm.		
Vegetables, 5 per cent	150 gm.	Supper	17
Potato	60 gm.		
Egg No. 1	30 gm.		
Bacon	15 gm.		
Butter	24 gm.		
Total			44

N. B.

Water, clear broth, coffee and tea (without sugar or milk) Ad lib. *if permitted.*
All foods *served or refused* must be recorded in detail of weight or quantity.
Diet to begin

CHARITY HOSPITAL

Diet Laboratory

Name Wm. J. James Ward 20 Bed 15 Service Med. No. 2

		24 Hour Carbo.	Diet in Prot.	Grams. Fat.
Food	Quantity	50	60	150
Cream, 20 per cent	300 cc.	10	10	60
Shredded Wheat No. 1	30 gm.	23	3	0
Vegetables, 5 per cent	240 gm.	8	4	0
Vegetables, 10 per cent	60 gm.	4	1	0
Uneeda Biscuits No. 1	7.5 gm.	5	1	0.5
Meat (Uncooked, lean)	130 gm.	0	26	13
Eggs No. 3	90 gm.	0	12	9
Bacon (Uncooked)	30 gm.	0	3	18
Butter	60 gm.	0	0	50
		50	60	150.5
		4	4	9
		200	240	1354.5
				240
				200
Total Calories				1794.5

			Carbo. Grams
Cream, 20 per cent	90 cc.	Breakfast	26
Shredded Wheat No. 1	30 gm.		
Eggs No. 1	30 gm.		
Bacon (Uncooked)	30 gm.		
Butter	15 gm.		
Vegetables, 5 per cent	150 gm.	Dinner	9
Vegetables, 10 per cent	60 gm.		
Meat	130 gm.		
Butter	30 gm.		
Cream, 20 per cent	210 cc.	Supper	15
Vegetables, 5 per cent	90 gm.		
Eggs No. 2	60 gm.		
Uneeda Biscuits No. 1	7.5 gm.		
Butter	15 gm.		
Total			50

N. B.

Water, clear broth, coffee and tea (without sugar or milk) Ad lib. *if permitted.*

All foods *served or refused* must be recorded in detail of weight or quantity.

Diet to begin ______

CHARITY HOSPITAL

Diet Laboratory

Name Frank L. Williams Ward 22 Bed 14 Service Med. No. 2

Food	Quantity	24 Hour Carbo.	Diet in Prot.	Grams. Fat.
		60	70	175
Cream, 20 per cent	300 cc.	10	10	60
Grits (Dry wt.)	15 gm.	11	1	0
Vegetables, 5 per cent	600 gm.	20	10	0
Vegetables, 10 per cent	120 gm.	8	2	0
Rice (Dry wt.)	15 gm.	11	1	0
Fish	75 gm.	0	20	0
Eggs No. 3	90 gm.	0	12	9
Bacon (Uncooked)	60 gm.	0	6	36
Cheese	30 gm.	0	8	11
Butter	71 gm.	0	0	59
		60	70	175
		4	4	9
		240	280	1575
				280
				240
Total Calories				2095

			Carbo. Grams
Cream, 20 per cent	150 cc.	Breakfast	16
Grits	15 gm.		
Egg No. 1	30 gm.		
Butter	20 gm.		
Bacon	30 gm.		
Vegetables, 5 per cent	360 gm.	Dinner	23
Rice	15 gm.		
Fish	75 gm.		
Butter	35 gm.		
Cheese	30 gm.		
Cream, 20 per cent	150 cc.	Supper	21
Vegetables, 5 per cent	240 gm.		
Vegetables, 10 per cent	120 gm.		
Eggs No. 2	60 gm.		
Bacon	30 gm.		
Butter	16 gm.		
Total			60

N. B.

Water, clear broth, coffee and tea (without sugar or milk) Ad lib. *if permitted.* All foods *served or refused* must be recorded in detail of weight or quantity.

CHARITY HOSPITAL

Diet Laboratory

Name Walter S. Johnson Ward 22 Bed 10 Service Med. No. 2

		24 Hour Carbo.	Diet in Prot.	Grams. Fat.
Food	Quantity	70	85	215
Cream, 20 per cent	300 cc.	10	10	60
Shredded Wheat No. 1	30 gm.	23	3	0
Vegetables, 5 per cent	600 gm.	20	10	0
Potato	90 gm.	18	3	0
Meat	110 gm.	0	22	11
Eggs No. 3	90 gm.	0	12	9
Cheese	60 gm.	0	16	22
Bacon	90 gm.	0	9	54
Butter	71 gm.	0	0	59
		71	85	215
		4	4	9
		284	340	1935
				340
				284
Total Calories				2559

			Carbo. Grams
Cream, 20 per cent	150 cc.	Breakfast	28
Shredded Wheat No. 1	30 gm.		
Bacon	30 gm.		
Egg No. 1	30 gm.		
Vegetables, 5 per cent	300 gm.	Dinner	28
Potato	90 gm.		
Meat	110 gm.		
Bacon	30 gm.		
Butter	45 gm.		
Cream, 20 per cent	150 cc.	Supper	15
Vegetables, 5 per cent	300 gm.		
Eggs No. 2	60 gm.		
Cheese	60 gm.		
Butter	26 gm.		
Total Calories			71

N. B.

Water, clear broth, coffee and tea (without sugar or milk) Ad lib. *if permitted.*
All foods served or refused must be recorded in detail of weight or quantity.
Diet to begin— ______________________________

APPROXIMATE AMOUNT OF PROTEIN AND FAT I

100 Grams (3⅓ Ounces)	C	P	F
Group I—Raw Vegetables			
Cabbage slaw	3	1	0
Celery	3	1	0
Cucumbers	3	1	0
Endive	3	1	0
Lettuce	3	1	0
Radishes	3	1	0
Tomato	3	1	0
Watercress	3	1	0
Group II—Cooked Vegetables			
Asparagus	3	1	0
Beans, string	3	1	0
Beans, wax	3	1	0
Brussels sprouts	3	1	0
Cabbage	3	1	0
Cauliflower	3	1	0
Egg plant	3	1	0
Kale	3	1	0
Leeks	3	1	0
Mushrooms	3	1	0
Pickles	3	1	0
Rhubarb	3	1	0
Sauerkraut	3	1	0
Spinach	3	1	0
Swiss chard	3	1	0
Tomato	3	1	0
Group III			
Beets	6	1	0
Carrots	6	1	0
Dandelion greens	6	1	0
Okra	6	1	0
Onion	6	1	0
Pumpkin	6	1	0
Squash	6	1	0
Turnip	6	1	0
Artichokes	16	2	0
Beans, baked	17	7	2
Beans, dry	55	22	2
Beans, lima, dry	65	18	2
Beans, lima, green	20	7	1
Beans, soy, fresh	7	38	15
Corn, fresh	20	3	1
Parsnips	12	1	0
Peas, green	15	7	0
Potato	20	2	0
Potato, sweet	26	2	0

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100 Grams (3⅓ Ounces)	C	P	F
Group I			
Blackberries	10	1	0
Cranberries	10	1	0
Grapefruit	10	1	0
Lemon	10	1	0
Muskmelon	10	1	0
Orange	10	1	0
Peach	10	1	0
Pineapple	10	1	0
Raspberries	10	1	0
Strawberries	10	1	0
Watermelon	10	1	0
Apple	14	0	0
Apricot	13	1	0
Banana, without peel	20	1	0
Cherries	16	1	1
Dates	70	2	2
Figs, dry	74	4	0
Grapes	19	1	1
Huckleberries	16	0	0
Pear	14	0	0
Plum	20	1	0
Prunes, dry	72	2	0
Raisins	76	3	3
Bread, white	53	9	1
Bread, white, toasted	61	11	1
Bread, rye	53	9	1
Bread, whole wheat	50	10	1
Bread, bran *(average)	40	10	1
Bread, gluten *(average)	30	30	1
Bread, casein	0	32	12
Bread, corn	46	8	5
Crackers, graham	72	10	10
Crackers, soda	72	10	10
Corn flakes	80	5	1
Cream of wheat	75	12	1
Soy Bean Flour	8	43	20
Macaroni	74	13	1
Macaroni, cooked	16	3	1
Oatmeal, dry	66	16	7
Oatmeal, cooked (1 to 4)	16	4	2
Rice	79	8	0
Rice, cooked	24	3	0
1 Shredded wheat biscuit	23	3	0
2 Uneeda biscuit	10	1	1
Zwiebach	73	10	10

*Bran and gluten flours or breads vary a great deal and those of known content may be used only when prescribed

AVAILABLE CARBOHYDRATE GRAMS OR PERCENT

100 Grams (3⅓ Ounces)	C	P	F
Group I			
Beef, roast	0	20	20
Beefsteak, porterhouse	0	20	20
Beefsteak, tenderloin	0	20	20
Ham, smoked	0	20	20
Lamb chops	0	20	20
Pork chops	0	20	20
Turkey, roast	0	20	20
Bacon, crisp	0	20	50
Beefsteak, sirloin	0	24	10
Beefsteak, round, lean	0	25	8
Beefsteak, round, fat	0	20	12
Chicken, broiled	0	20	3
Chicken, roast	0	20	5
Ham, fresh, lean	0	25	15
Lamb, roast, lean	0	20	12
Liver	2	20	5
Pork chops, fat	0	15	25
Sweetbreads	0	17	12
Tongue	0	20	10
Veal cutlets	0	20	8
Veal, roast, lean	0	20	6
Bass	0	20	2
Codfish	0	18	1
Halibut	0	18	6
Oysters, raw	4	6	1
Salmon	0	22	12
Sardines, canned	0	23	20
Trout, brook	0	20	2
Trout, lake	0	18	10
Cheese, American	0	28	36
1 egg, whole	0	6	6
1 egg white	0	3	0
1 egg yolk	0	3	6
Gelatin, dry	0	100	0
Gelatin, cooked	0	3	0
Butter	0	0	85
Lard	0	0	100
Mayonnaise dressing	0	0	100
Salad oils	0	0	100
Cod Liver Oil	0	0	100
Coco-Vitamin	20	5	40

100 Grams (3⅓ Ounces)	C	P	F
Buttermilk	4	3.3	0.
Cheese, cottage	4	20	1
Cream, average	2.8	2.8	20
Cream, thick (double)	1.5	2	40
Milk, whole	5	3.3	4
Milk, skimmed	5	3.3	0.
Milk, malted, dry	66	14	8
Almonds	17	20	55
Brazil nuts	7	16	66
Chestnuts	40	6	6
Cocoanut	28	6	50
Filberts	12	16	66
Hickory nuts	12	16	66
Peanuts	22	25	40
Pecans	15	10	70
Walnuts, black	10	25	55
Walnuts, English	14	16	64
Cocoa	36	20	28
Chocolate	30	12	50
Honey	81	0	0
Olives, green	8	1	20
Olives, ripe	4	1	20
Peanut butter	18	30	45
Bavarian cream	1.4	8.8	42
Custard	5	5.8	6.

DIABETES INSIPIDUS

General Statement. Definition.—This is a condition characterized by the output of a large amount of urine of a low specific gravity and low salt content. Two general types are recognized:

First. The primary, that which seems to be unassociated with demonstrable cause.

Second. The secondary or symptomatic, that which is associated with etiological changes.

Incidence.—This condition is rather rare. While many patients may show a urinary output beyond the average, the classical disease of diabetes insipidus is certainly not frequently met with in practice. It may occur anywhere and in all types of people, it is more common among males, and also more frequent in young people.

Etiology.—This is not thoroughly understood. Among the factors that seem to play a part are heredity, shock, sustained mental stress, excessive exposure, trauma, syphilis and abnormality of the pituitary gland.

Course and Prognosis.—This depends largely upon the type of the disease. The primary condition is not incompatible with normal life, and is more apt to cause inconvenience than to lessen life expectancy. In the symptomatic group the course and prognosis depend upon the primary cause.

Symptoms and Diagnosis.—Of primary importance here is establishing the cause of the condition and eliminating other factors that may be of importance. This would necessitate a most thorough investigation and a carefully made history. The keeping of proper records is essential. The onset is usually gradual, and often the patient cannot say definitely when the trouble began. The constant symptom, of course, is polyuria. At times the amount of urine passed may be very large. This naturally causes thirst, a tendency to dry mouth, and other discomforts. There is usually impaired physical efficiency. There is also a decided tendency to nervous disorders, which may be largely the result of the inconvenience, loss of sleep, and anxiety, which are necessarily entailed. As might be expected also from the excessive fluid intake and output, there is often disturbance of the alimentary tract such as indigestion, constipation, and tympanites. In severe cases there may be headache, visual disturbances, and other serious phenomena.

Laboratory. The laboratory gives nothing definite except the urinalysis. There is the characteristically excessive amount of urine of low specific gravity and low in salts.

Every case should be thoroughly x-rayed to establish any pathologic change in the head, particularly of the pituitary body.

Differential Diagnosis.—The only confusing conditions are diabetes mellitus and chronic nephritis, but the laboratory examination together with the other outstanding symptoms will render a differential diagnosis easy.

Prophylaxis.—There is nothing definitely known that might be suggested in the way of practical preventive measures.

Treatment. General Considerations.—Treatment is decidedly unsatisfactory in the majority of cases. The patient should naturally have the benefit of all the general measures that are directed towards maintaining health, such as the proper balance between rest, recreation and work; avoidance of unnecessary nervous strain; attention to digestion and intestinal elimination; and careful mental hygiene.

General Medication.—Valerian and ergot have been recommended at times, but their value is more or less questionable. Active medication will, in most cases, result in more disadvantages than any hope for benefit would justify. The pituitary body has been given by mouth with a certain measure of benefit. Hypodermic injections of pituitrin give temporary relief in most cases, but as the effect only lasts a few hours several injections a day are required and it does not seem to produce any permanent benefit. In most cases the transient effect would hardly justify the inconvenience and discomfort entailed. Some cases are benefited by antisyphilitic treatment, and it would seem that all cases should have the benefit of this therapeutic test. The lumbar puncture has given prolonged relief and in some instances permanent benefit has been reported.

OBESITY

General Statement. Definition.—Obesity is a condition characterized by an abnormal amount of body fat. Several types are recognized, such as: The anemic and the plethoric; also those due to faulty metabolism; and those due to glandular disturbances, particularly of the thyroid and pituitary body.

Obesity is really a condition or a symptom more than a disease per se. It should also be remembered both in making a diagnosis and in deciding upon the treatment, that individual conditions must be considered. It is not wise always to be guided by a fixed table of weight in relation to height; the type of individual must be taken into consideration, for what would constitute overweight for one type might be entirely normal for another. Sometimes the relation of weight to age is overlooked. In adult life, up to a certain point, there should be an increase in weight as the age advances. A glance at the height and weight tables published by the insurance companies and other authorities will show that this is given due prominence. There is considerable difference in the character of fatness in different individuals. The particular areas of deposit are influenced to a large extent by heredity, sex and age. For example, some families have a distinct tendency to increased fat in the abdomen, some in the hips, and some in the lower limbs. After middle life, it is rather the rule for abdominal fat to increase. In women the over development is usually in the region of the hips.

Incidence.—Any race, sex, age or class many be affected. It may be said in a general way that the condition is more common among females, and among these it develops particularly at about the age of puberty and the menopause. It is naturally more often found among persons leading an inactive life. Certain races or nationalities show a larger percentage of this condition than do others, such, for example, as the Dutch, the Orientals, and certain African tribes.

Etiology.—Many factors may play an important part. Among those of particular interest is heredity. It is probable that the main trouble here is that the individual inherits faulty tendencies in the matter of living, as over-eating and under-exercising. The importance of the development of habits through family contacts should not be overlooked. The direct cause of the majority of cases is an improper balance between exercise and diet. Abnormal increase in weight is particularly common among those who have been physically active and then drop into sedentary habits. For example, the college athlete who comes out of college, takes an office position and discontinues his physical training, or the outside man who is promoted to an office position; or the young woman who before marriage indulges in strenuous activities and after marriage settles down to an indoor life.

It is probable that the automobile has a tendency to increase the weight of a large portion of the human race, in that it lessens so materially the amount of physical exertion necessary for the daily affairs of life. For example, I knew of one young city physician who was practicing on foot and using street cars when necessary. He walked about 150 blocks a day. Upon becoming sufficiently prosperous to acquire an automobile, he promptly gained twenty-five or thirty pounds in weight without any other material change in his environment or manner of living.

The fault may be in the character of the food. Fats and sugars are often responsible. Alcoholics, particularly beer, tend to cause overweight.

There is a certain group of cases where the increase in weight is caused by glandular disturbances, particularly of the thyroid and pituitary. In this connection it should be borne in mind that there is a tendency to increase in weight as a result of any condition that does away with the gonad function, such as the menopause, ovariectomy, or the loss of the testes through disease or castration.

Course and Prognosis.—This depends upon several factors:

First. The cause of the disturbance.

Second. The extent to which the patient can or will cooperate in the necessary remedial measures.

Third. The physical condition of the patient. Under this head will come those cases which through general disease or impairment of the lower extremities are unable to indulge in the necessary activities.

As a rule, the treatment of these cases is rather discouraging. They are usually persons who enjoy eating and who are disinclined to activity, and a large percentage of them will start out with the best of intentions, but soon succumb to temptation.

Symptoms and Diagnosis.—The diagnosis of obesity can naturally be made without difficulty. It is merely a matter of ascertaining the height and weight of the patient, and comparing these with the proper standards. Of course, to a certain extent, the type of the individual must be taken into consideration. From the standpoints, however, of both prognosis and treatment it is necessary to give these patients the benefit of a most thorough investigation. This should include a careful history, particularly with regard to family tendencies, habits of living, and previous disease. The patient should be thoroughly examined to determine the organic and functional condition. This investigation should include a complete blood picture, a urinalysis (the functional tests are also usually advisable), and a thorough physical examination, particularly of the circulatory apparatus. During treatment these investigations should be repeated from time to time.

The principal factors that must receive consideration are: The cause of the obesity; the type and the general condition of the patient. From these may be determined the diet and physical activity that can be ordered with the maximum of safety and benefit.

Particular care should be exercised that edema be not mistaken for obesity.

There are several conditions that usually accompany, or rather result from this condition, such as shortness of breath, particularly upon exertion; high blood pressure; foot troubles, particularly fallen arches; a tendency to erythema, particularly where the body surfaces come in contact. In the anemic type there is naturally an early tendency to the development of discomfort upon exertion.

Differential Diagnosis.—The main consideration here is to differentiate types; for example, the simple case resulting from overeating and underexercise from the case due to deficient thyroid secretion.

Prophylaxis.—This should begin in early childhood, and is concerned particularly with the proper balance between diet and exercise. Physicians should encourage the habit of regular weighing, and should impress upon all patients the necessity of maintaining at least approximately the proper standard of weight, compared to height and age. It is not going too far to say that each home should have good scales and that these should be used systematically and proper records kept.

Treatment.—The first consideration is to decide as to the ideal for which to strive in any particular case, and in this individualization is essential. In other words, when a patient presents himself for treatment and has been sufficiently investigated, the physician should decide as to what weight would be proper for that particular person.

It is desirable in the beginning to estimate the possibility of success, and there are few things more discouraging than to try to reduce the weight of a stupid or obstinate patient. In this type of individual, particularly, institutional treatment would be ideal, but few patients will consent to this plan unless the conditions are extreme and the need imperative. It is well in the beginning to have a definite understanding as to the length of time the patient is to conform to measures of treatment. This will, of course, depend upon the amount of reduction that is considered desirable. My usual plan is to have an understanding that they are to see me once a week for six months or a year, and during that time are to live entirely according to my orders.

If there are any abnormal conditions such as defective feet, that require correction, this, of course, should receive prompt attention.

General Care.—All patients, of whatever type, should be subject to all measures looking towards the maintaining of the best possible state of general health. This would include such matters as dental hygiene, bathing, ventilation of sleeping and working quarters, clothing, sleeping habits and intestinal elimination.

Diet.—We of the profession are sometimes prone to overlook the fact that the average patient does not understand the most elementary principles of physiology, and it is often advisable to take the time to go into the matter in some detail. The patient should be given to understand that a certain amount of food is required by the body to supply heat and energy and to repair tissue waste and that food beyond this may be stored by the body as fat. They should also thoroughly understand that exercise increases the combustion of this material. In teaching this I often illustrate it by using a railway engine as an example. If a certain amount of coal is put into the tender each day and the engine does not do sufficient work to consume the amount, it will accumulate until the tender overflows. On the other hand, if the amount of coal put into the tender each day is reduced and the engine continues to work, it will reduce this accumulation of coal until there is an actual deficiency. There are three plans for preventing the tender from overflowing: one is to reduce the amount of coal put in daily; another is to increase the work of the engine; another is to strike the happy medium by both reducing the daily supply of coal and increasing the work of the engine. Food values can be illustrated in the same way. An engine doing a certain amount of work will use more soft coal than it would anthracite.

The diet cases rather resolve themselves into four classes:

First. Those that may be handled by merely reducing the sweets and fats. It is probably better to give to these cases a detailed list of what this should include. For example, "Omit all sweets and fats, as sugar, candy, cake preserves, syrup, honey, cream, butter, olive oil, and fat meat." These simple instructions will meet the requirements in many cases, provided the amount of exercise is reasonably increased.

Second. Where the sweets, fats and starches are restricted. In these cases in addition to the preceding list of food to be omitted we add bread, rice, grits, mush, cream of wheat, potatoes and sometimes other items. This plan will, if the exercise is reasonably increased, meet the requirements of a very large percentage of cases and their eating may not be otherwise restricted.

Third. In this group the patient is given a list only of the foods that he may eat without any restrictions as to amounts. In these cases the diet consists of only those foods that are poor in carbohydrates and fats; this can be made up from any table showing food values (see page 534). It may begin somewhat as follows: "Eat only skimmed milk, buttermilk from which the butter has been removed, strained vegetable soups, boullion, strained broths (without cereals), fruit (without sugar), cabbage, collards, spinach, lettuce, celery, cauliflower, artichokes, raw oysters, lean roast beef, veal, mutton, fish," etc. Depending upon conditions, a certain amount of bread, breakfast foods, eggs and other items may be added to this list.

Fourth. There are a certain number of cases where it is necessary in order to obtain results that the patients not only be given a list of things they may eat, but the amount specified. In these cases it is necessary that the patient be trained in food values, and it is better, as a rule, to let him take a table somewhat as shown on page 534, and make up his daily diet, limiting it to a definite number of calories. In all of these cases it is essential that the results be closely watched, not only by weighing the patient at least once a week, but by taking into consideration his general response to the plan of treatment both as to his appearance and sense of well-being. The urine should be examined particularly for the acetone bodies. It is highly undesirable to have the patient lose weight too rapidly. In a majority of cases a loss of about one pound per week may be considered a safe average.

Exercise.—A great advantage in the use of exercise is that not only may the weight be reduced but the health and general feeling of well-being are materially improved.

Individualization is necessary. The amount of exercise to be ordered in the beginning will depend upon the condition of the patient. Of particular importance is the condition of the circulatory apparatus and the amount of exercise the individual has been taking, the age, and the desired results. Among the forms of activity that are most advantageous should be mentioned the following:

Setting-up Exercises. These are probably our most valuable adjuncts to treatment. The amount to begin with will depend upon the various factors just mentioned. It is better as a rule to start with what will be well within the ability of the individual, as the tendency to discouragement is always present and it would be added to very much by the discomfort that would follow an excessive amount of activity to which the patient was unaccustomed. As a beginning, some simple free-hand setting-up exercises are most satisfactory. The physician can either instruct the patient in these or refer him to some competent physical director. These exercises should include the use of all the body muscles as far as possible, at first only a few movements a day being attempted and the number of these gradually increased. These are better taken twice daily, that is on first arising in the morning and before retiring at night. The morning exercises, particularly, should be followed by a bath and rubdown. The bath should be either a cold shower, a cold plunge, or the patient may begin with a hot bath and follow it by a cold dash and rubdown. The rubdown is best given by the patients themselves, as the activity that it involves is desirable; its importance as a part of the plan of treatment cannot be too much stressed. The Manual of Physical Training of the U. S. Army can be obtained from the Superintendent of Documents, Washington, D. C., for fifty cents, and there is no better text book in print today. It is possible, also, to obtain the exercise records which are used on a phonograph. These are accompanied by more or less complete instructions, but most of those on the market are poorly balanced.

Gymnasium Work. In a properly conducted gymnasium one is able to follow a system of exercises that it is impossible to carry out in the home. In addition to this, there is the advantage of the driving force of the director and the stimulus of association with others in the activities. I have often observed unfortunate results from patients being sent to a gymnasium and over-exercised. It is better for the physician to have a talk with the physical director and to outline his desires. Special private training in a gymnasium is, of course, the ideal plan in the beginning. In most institutions there are classes particularly adapted to the various degrees of physical deficiency.

Walking. Of all outdoor exercise walking is the most uniformly satisfactory. The patient should be taught how to walk and the distances should be carefully estimated and definitely prescribed. It is better to choose pleasant localities, such as parks, residence avenues and country roads. One may begin with short walks, such as fifteen to thirty blocks, and gradually increase to four or five miles. The feet should be kept in good condition and should be comfortably shod. If possible the walk should be properly arranged with regard to meals and, especially in hot weather, it is desirable to have the walk followed by a bath and rubdown.

Running. Later on a certain amount of running may be ordered, depending upon the condition of the patient. The advantage of this in reducing the weight of college athletes is well known.

Golf. Golf, which is really a modified form of walking, is within the physical limits of most patients and may often be recommended.

Swimming. This is highly satisfactory and may be adjusted to almost any type of individual. It is one of the most valuable forms of exercise, particularly from the standpoint of weight reduction. Needless to say the swim should be followed by a brisk rubdown.

Other forms of activity may be used to meet the requirements, such as tennis, basketball, rowing, hunting and bicycling.

It cannot be too strongly emphasized that it is necessary to follow the patient's response to exercise by repeated and careful investigations, this should include particularly the pulse rate and blood pressure.

A safe rule to keep in mind is—If with the reduction in weight there is not an increase in the sense of well-being something is wrong.

UNDERWEIGHT AND WEAKNESS

General Statement. Obligations and Responsibilities of the Family Physician. There is a tendency for the physician, even when he understands that he is the medical advisor of the family, to investigate and treat only those conditions for which his assistance is specifically requested. This is sometimes the result of the individual's conception of medical ethics, sometimes the result of insufficient interest or an imperfectly developed sense of observation, and sometimes it is the result of carelessness or even laziness.

In accepting the responsibility of medical advisor of a family, the physician must consider his duty to the family, to the community and to himself, as well as the obligations imposed by ethics. If one takes an automobile to the garage to have a particular defect remedied, and if there be some other obvious damage, a good mechanic is expected to discover it. If he does discover it, as the caretaker of the car, he is obligated to report a condition that threatens to lead to trouble. It would be a poor excuse if after disaster had developed, he would acknowledge that he knew that it was coming, but had not been asked to attend to that particular condition.

The veriest tyro in medicine can usually treat successfully the vast majority of human ills as they present themselves in routine practice, but the physician of greatest worth, is the one who can come nearest to putting those under his care into the highest possible state of well-being and keep them there.

The medical profession has been lax at least as compared with the dental in not encouraging routine periodic examinations for every one. The great lessons taught by the world-war in this particular seem to have been largely lost. If the Standard Oil Company finds it to its advantage to have every pump tested every day, it would certainly seem worth while for a human being to have so delicate and important a pump as the heart investigated occasionally, at least. Every physician should be a disciple of this idea. It is certainly inadvisable to carry these matters to extreme, as one who urges the surgical removal of every wart that appears in his practice, but a phsician has a duty to all concerned and should avail himself, in an ethical way, of every opportunity to contribute to the sum total of health and good feeling.

How This Work Develops. There is probably no phase of medicine that develops a higher appreciation from those benefited. When a community sees an individual who has been more or less an object of sympathy blossom out into splendid manhood or womanhood, the idea of such possibilities spreads and the individual becomes a veritable missionary of good health. Let me give an illustration:

I was called to see Mrs. R. for an acute condition, which was promptly relieved in a few hours. She was pale, underweight, nervous, and upon inquiry gave a history of being easily tired, irritable, and below par generally, and had been so for several years.

When asked what attention she had received, it was found that previous medical attendants had treated her for the acute condition for which I had been called and done nothing further. She had gone, at the insistence of her family, to one physician who prescribed "a dose of calomel," and had not suggested further attention. I suggested, in a kindly way, that she was not realizing as much out of life as was possible; that I did not know what could be done for her, but that if she cared to have the matter pursued further and would come to my office, I would investigate and then tell her what I thought of the case.

After a thorough history and examination no major defect was found, and it seemed only to be a case of an improperly regulated life, particularly from the standpoint of diet, rest and recreation. After going over the matter with her, as I saw it, she placed herself under my professional care and in the course of a few months showed such spectacular improvement in every way, that I found myself associated with one of the most highly appreciative families it has ever been my privilege to treat. Not only that, but if you care to consider another phase of the subject, in less than a year more than twenty other families had come to me through the influence of that case, for somewhat similar investigation and treatment.

I remember one of these patients, especially, who came to me, before being discharged, with the statement that her husband had sent me a message to the effect that I could add to his bill any consideration I saw fit, for the way in which her disposition had been improved.

Precautions on Assuming the Case. There is often a very discouraging period, sometimes due largely to an inability to secure adequate coöperation. It is probably inadvisable to undertake the care of a case of this kind until a thorough investigation has indicated to the physician the possibilities and probabilities of success, and until he is convinced that he can have the coöperation of the patient for a length of time sufficient to produce results, for a period of at least several months. It is always unwise to make any definite promise of benefit. This does not exclude the necessary cheerfulness and hopefulness that are almost essential to success.

Etiology.—In investigating the average case of the type under discussion, it is well to bear in mind those factors that have been found most commonly responsible for a lowered state of nutrition or for impaired mental efficiency and nervous balance. It is not practical to try to give all of the possible factors or to state them in the order of their importance.

Heredity. Many persons interested in gaining weight or in increasing their efficiency, present a history in which heredity has to be considered a factor. They come under the group of "Pharoah's lean kine," and in spite of all that is done they consistently show little in the way of improvement.

In making a prognosis it is necessary to consider family tendencies, and the child of 100 pound parents will hardly develop into as large or strong a man as will the child of the neighbors who comes of a stock

50 to 100 per cent larger. There are whole families with an almost irremediable tendency to leanness or to obesity.

Starvation. This may be considered in several groups.

1. The highly respectable poor, or those who are keeping up an appearance of comfort and sometimes even of luxury and doing this at the expense of their table and in other ways that are not visible to the outside world. I remember hearing an old physician make the remark that "when treating the respectable poor, always consider starvation as a possible factor in the condition of the patient." Let me give an illustration:

A young woman was sent to me for treatment. She had lost thirty pounds in weight and was in a condition far below par from every standpoint. In spite of all my efforts, she failed to show any material improvement. After some weeks I discovered that her husband had lost his position, that they had exhausted their financial resources, and that while maintaining a highly respectable front, they were absolutely destitute. I was fortunate enough to secure for her husband a satisfactory position and, without further treatment, she was normal and above in the course of a few months.

2. The destitute group or those who are frankly poor. They present little difficulty in diagnosis in this regard.

In both of these groups satisfactory results depend largely on an adjustment of their economic status.

3. Intentional Starvers. This group includes those who for some particular reason voluntarily deprive themselves of sufficient nutrition. The country is swept occasionally by a convulsion of fashion for the willowy, wispy figure for women, and in their efforts to meet the requirements, many will go to any extreme.

I remember one case particularly, a girl brought to me by her mother. I treated her for several months without any success, discovering later that she was secretly doing everying that she could to defeat my efforts to restore her to a better state of nutrition.

It is not uncommon to have patients who are really in rather a serious condition as a result of their efforts at reduction, in other words, they have put in motion a process that they are unable to check. In so far as the medical profession has influence, it should bring it to bear against the vicious dictates of a fashion such as this.

4. Unintentional Starvers. Very often individuals will suffer through ignorance of food values or through their inability to properly handle the food that they take. Let me illustrate:

W. C., a boy about ten years old, was markedly below weight and below strength. He not only failed to gain for two years, but had lost six pounds during that time. While investigating the case, I happened to be at the home at meal time. The boy was sitting down to a lunch consisting of a glass of iced tea with a lemon squeezed into it, a sliced tomato with vinegar, some chow chow pickles and a couple of soda crackers. With little treatment other than a regulation of the diet, the boy gained fourteen pounds the following year.

Mr. F. F. sought advise for marked loss of weight and strength and general lowered efficiency. After a thorough investigation, no defect was found except that most of his teeth has been removed, in fact none remained except a few incisors on which he had to depend entirely. He was unable to masticate hard food and no effort was being made to provide him with any food of a proper character, and he did not realize the necessity for it. While his remaining teeth were being put in condition and properly fitted plates prepared, he was given soft food in sufficient amounts. As soon as the dental work had been completed and he had acquired sufficient use of his artificial chewing facilities, his diet was increased and practically without further treatment, he made a complete recovery.

Over-work. Reference is made here particularly to physical work beyond the individual's capacity. The results are too obvious to require discussion.

Worry and Mental Strain. Often this is not realized even by the individuals themselves. The effect may be direct or indirect. It is particularly vicious when it interferes with appetite, digestion and sleep.

Insufficient Rest. In addition to those suffering from over-work physically, and worry and mental strain, there is a group not effected by any of these, who still do not get sufficient rest to meet their requirements. This is found among students working their way through school, many of whom try to attend classes, study and carry on some vocation, also among mothers who try to do a large part of their work after the children have gone to sleep. It is very commonly a consideration in the treatment of society people who, no matter what their vocation may be, spend a large part of the night in social dissipation.

Habits. In addition to the habits of work and worry, there are those of the excessive use of alcoholics, tobacco, tea, coffee, etc., also fast and irregular eating, and many others that will be discussed elsewhere.

Indigestion. This is one of the most common causes of underweight. Proper digestion and proper assimilation are essential to the food intake being of value.

Diarrhea and Dysentery. These are more common as causes than are often realized. The following will illustrate:

Miss B., a school teacher, came for treatment for underweight and lowered efficiency. It was only after several weeks that information was obtained by accident that she averaged five or six intestinal evacuations daily. When asked why she had not mentioned this and had stated that her bowels were normal, she said that it was because this condition had obtained for twenty odd years. Amebic dysentery was found to be the trouble.

Constipation. The ultimate effects of constipation are so extensive and important that it cannot be overlooked as a factor.

Intestinal Parasites. The role played by intestinal parasites is often underestimated. It is only necessary to think of statistics secured in the hook-worm campaigns to appreciate this fully. An investigation of the students of a Class A medical college revealed that over half of them were affected. In children, particularly, intestinal parasites must always be considered a possibility.

Respiratory Obstructions. Good air is an essential to perfect health. Therefore, anything that interferes with the respiratory function requires correction. This is found particularly in children where enlarged adenoids or tonsils are a factor.

One other matter that should not be overlooked is the occasional tendency of fashion to constrict the chests of women. The corset has largely been adandoned, but the probably more vicious brassier is sometimes worn so tight as to render proper breathing impossible.

In infants or very young children often clothing is found to be of such a type as to constrict the chest.

Tuberculosis. The morbidity and mortality of this disease will indicate the part it plays. It is particularly important to remember that the disease may smolder for years without giving any definite evidence, yet interfering with the individual's well-being.

Syphilis. Its importance might be well expressed by borrowing the statement of McGuire, namely that he owed his success in medicine to his having always suspected the presence of syphilis. The tendency is to overlook its influence upon the well-being of the individual when it may not be sufficiently evident to have its presence demonstrated.

The most spectacular progress that I ever witnessed was in a group of children in a slum district. I visited them in company with their medical attendant and not again for several months. I was surprised at their remarkable development and, on asking what had been done, was told that nothing unusual, except all had had mercury continuously since my previous observation. This had been given without reference to any clinical findings.

Malaria. In some sections of the country malaria must be suspected in almost every case of disease or lowered vitality. The importance of this was well demonstrated by Bass and his associates in a survey, consisting of the investigation of about 40,000 persons in two counties in Mississippi. Over half were found to be infected.

Diabetes. Though not a common disease, it is one that is sometimes overlooked and is mentioned here because the tendency is particularly towards loss of weight and strength.

Anemia. Primary anemias are relatively rare; secondary anemias are common.

We have to consider anemia purely as a symptom and look for the primary trouble. In young women chlorosis is fairly common.

Pelvic Disorders. This is a factor of major importance and, directly or indirectly, is responsible for a large percentage of disability in women, particularly those who have borne children.

Frequent Pregnancies. Just what part this plays in the health of women has never been definitely determined. Some physicians have claimed that the normal is a child every 18 to 24 months throughout the childbearing period. Probably the frequency of pregnancy is not so much a factor as other conditions that obtain in a particular case; that is, for example the care that the mother receives during pregnancy and delivery, and more particularly the later care in the amount of rest that she can obtain and her freedom from responsibility and excessive physical effort.

When a mother has the care of a heavy infant, particularly when lactation is improperly regulated or too long continued, it is almost the rule that her physical condition suffers. On the other hand, when these matters can be regulated, when she can command sufficient help, we often see cases where the well-being of the patient seems to be actually improved with each succeeding pregnancy.

Lactation. This is a frequent source of trouble from two standpoints.

When the nursing of the infant is improperly regulated, and particularly when it is allowed at night, the well-being of the mother suffers.

When the lactation is too prolonged and the mother taxes her digestive ability to secure the nutrition necessary for her own upkeep and that of a rapidly growing child who is not getting sufficient nourishment from artificial feeding, she necessarily pays the price.

Foci of Infection. These must always be considered and the more common sites, as the tonsils and teeth, investigated.

Examination and Diagnosis.—There is probably no type of case in medicine that requires a more thorough investigation than the one under discussion.

In the first place, the examiner must find any organic or functional disorder that is present, so that it can be remedied or taken into consideration in the prognosis. It is highly embarrassing to treat a case for a protracted period only to find that some condition, as syphilis or tuberculosis, is standing in the way of all efforts that have been used.

Again, the investigation must be of sufficient thoroughness to command the confidence and, therefore, the cooperation of the patient. In this type of work we often do not feel satisfied unless there is some voluntary expression from the patient showing that the thoroughness of the work that is being done is understood and appreciated. Such expressions are not unusual: as, "Doctor, I know that if there is any trouble with me you have found it," or "If this is what it takes to make an examination, it is the first I have ever had."

History. This should be complete in every detail and should include particularly the matter of habits. It is of importance in the investigation to ascertain if the environment of the patient be such that proper measures can be carried out under the conditions that obtain.

Physical Examination. This should be as nearly complete as possible. Here, especially, we are interested in many conditions that would not be of major importance in the average case, such as vision, the chewing facilities, and the condition of the feet from the viewpoint of increased exercise. In the case of a married woman, a thorough pelvic examination is usually indicated.

A temperature and pulse record should be made.

A weight record is, of course, indispensable and should be kept throughout the period of supervision.

Laboratory. As a routine there should be a blood picture, including the Wassermann test, a urinalysis, and where there are any special indications, such further examinations as that of the feces and sputa.

Collaborating the Data. It may take quite several days to complete an investigation of this scope, but when it is complete, or as nearly so as is possible under the the circumstances, the history, the records of the physical examination, laboratory work, temperature and pulse chart, and any other reports as x-ray, that may have been made, should all be carefully collaborated and the patient or those concerned advised as to the findings and as to the possibilities, or rather as to the probabilities, of the case.

Treatment.—The phases of treatment can be placed in four groups:

1. Correction of any organic, function or habit defects.
2. General Care.
3. Exercise.
4. Diet.

General Care.—Rest. It is necessary to see that the patient gets the proper amount of rest and exercise, of work and recreation. Probably the Mosaic program has never been improved upon,—8 hours for work, 8 hours for recreation and 8 hours for sleep.

It is sometimes desirable to begin with a modified rest-treatment. This may be particularly desirable where the circumstances of the patient will permit it; where the patient is in a particularly unfavorable condition, or where previous efforts at relief has proven unavailing. Excellent results may be secured in this way when other measures have failed.

There may be used here very much the same plan as that carried out for tuberculosis. The patient is put to bed for a number of weeks, the time depending upon circumstances, during which time he may be allowed only to go to the bathroom when necessary, and every effort made to give him perfect relaxation and the greatest possible freedom from all factors that might interfere with comfort.

During this time his diet depends upon his condition. It should, under any circumstances, be adjusted to the digestive ability of the individual. It is often well to begin with a diet such as milk, milk shakes, cream soups, gelatin, custard, toast, butter, well cooked cereals, and creamed potatoes and gradually to increase this as conditions indicate.

Following the rest in bed, and depending on the length of this confinement, there should be a period during which these patients are carefully put on their feet, just as is done in the management of tuberculosis. From this they are graduated into exercise.

It is highly important that during this period of rest every factor be brought to bear that will tend to keep the individual comfortable and cheerful, and such matters as company, reading and music should be under proper control.

In those cases where the rest-cure is not employed, the physician should see that the patient has sufficient rest to meet requirements. A mother may be persuaded to retire earlier and to take a rest-period during the day. The merchant may be convinced of the advisability of staying more hours away from his place of business. To illustrate:

A medical student complained of loss of weight, weakness and lowered mental efficiency. He was told to spend eight hours in bed and two hours of each day and all of every Sunday in rest and recreation. He claimed that he could not comply because even by studying all the time he had failed in every examination so far that term. He was finally convinced of the advisability of making the experiment. Sundays and a certain part of his holidays were spent in rest and recreation, one hour daily in the park, which was near his dormitory, and one hour daily in the gymnasium. He went through the remaining three years of his college course without failing in a single examination, gained over 20 per cent in weight and many times that in good feeling.

Sleep. This is one of the fundamental protective measures of nature. The exact amount of sleep required by the human animal has never been definitely determined. It is probable that the requirements of different individuals vary throughout a wide range, but average between seven and eight hours.

Not only should the proper time be devoted to sleep, but the proper type of sleep is necessary; that which is obtained by the use of drugs is of questionable value.

There is an old adage that should be drummed into this class of patients, "People should not take their daily affairs to bed with them."

Very often lack of sleep is the result of domestic conditions that can be corrected if proper pressure is brought to bear.

Ventilation. The necessity for the proper amount of pure air is too well recognized to require discussion. This applies to both the living and the working quarters. This should be a matter of investigation on the part of the physician and any defect corrected as far as possible. In many cases outdoor sleeping is found to be of marked benefit. Sometimes a change of location may be desirable or even necessary.

Clothing. Some are impairing their health by insufficient clothing and others by too much, and still others by the lack of proper changes. This is particularly common in the case of those who are subject to acute respiratory infections.

Bathing. This is a matter that requires particular individualization and those who follow an arbitrary rule in prescribing will meet with many disappointments. In the majority of cases physical vigor is probably promoted by the cold bath or by the warm bath followed by a cold sponge or shower. It is probable that the amount of exercise that an individual takes has much to do in this particular. A young person who is taking active athletics may take a cold bath with positive pleasure, while others who lead a more sedentary life may find it a punishment or even an actual damage to their physical status.

Exercise.—This is the most important factor in bringing many of these patients to normal weight, strength and feeling of general well-being. It markedly influences nervous stability.

The possibilities of properly regulated physical exercise are almost immeasurable. A patient once complained to me that I was giving her exercise to increase her weight and that she had found that I was giving her chum exercise to reduce her weight. I explained that in the case of her chum I was building muscle but using up fat, and that the fat was going faster than the muscle was developing; while in her case, I was building up muscle and she had no surplus fat to be affected. The ultimate results in the two cases convinced her of the logic of the procedure.

Exercise not only directly strengthens and increases the muscular structures, but it improves the appetite, favors digestion and elimination, promotes sleep and directly and indirectly influences favorably the mental processes, and in fact, every function and every cell of the body.

Setting up Exercises. These should be adapted to the individual and no arbitrary rule followed. In The Manual of Physical Training of the United States Army, the statement is made that there is no known form of exercise as conducive of good results. There are two common systems of teaching it:

One is to begin with a small group of muscles, exercise them thoroughly, and gradually add other groups.

The other system, which seems preferable, is to begin with all available muscles and exercise them very lightly at first and gradually increasing the number of movements, depending on the reaction of the individual.

One thing that is to be particularly guarded against is over-exercising these patients in the beginning and thereby producing such a state of discomfort that they become discouraged.

The little system that I have used personally and encouraged my patients to use consists of selections from the Manual of Physical Training of the United States Army and from various other systems and sources. It begins with the fingers, then wrists, arms, shoulders, chest, waist, back, abdomen, hips, legs, feet, and ends up with breathing exercises. To this is later added stationary running, mat work, dumb bells, and, in selected cases, muscle tension.

Some individuals will naturally require more of this than others and it is advisable to be guided to a certain extent by the desire of the patient. For example, a young man who particularly desires physical strength should have much more exercise than a young lady who simply desires a state of well-being.

It is hardly possible in the scope of this article to go into detail as to the particular movements to employ. This is fairly well taught in public schools and especially in most colleges. There are also several million men in this country who have had thorough training in this in the Government service. It is not so much a matter of "not knowing, as of not doing."

There are many systems of physical culture advertised. As a rule, they are not well balanced. Most of the promotors are not sufficiently conversant with requirements and much damage may be done by even those systems that have been carefully studied out by men of efficient training, in using one prescription for countless thousands of patients. Probably the best treatise obtainable today is the Manual of Physical Training of the United States Army. This can be obtained by sending 50 cents to the Superintendent of Documents, Washington, D. C.

"Exercise to music" appeals to many. If this is properly regulated and sufficiently supplemented, some of those systems on the market can be made to serve a useful purpose.

About ten minutes, night and morning, seems to meet the average requirements for this type of exercise. One of the important considerations is to have them carried through in the proper way. It is desirable where these are taken in the home, to have the patient stand in front of a mirror. This fixes attention and has several other advantages.

Any type of exercise should be carefully watched as to its effect, particularly on the heart, until the tolerance of the individual has been ascertained.

It should be understood that no matter what other form of exercise should afterwards be taken, the setting-up type should not be discontinued.

Special exercises may be ordered for constipation. See Constipation (page 480).

Gymnasium. Where there is access to a gymnasium, it is of unlimited value from several standpoints.

As an educational institution the individual is taught what exercises to take and how to take them. They do this under competent supervision and can later adapt a sufficient amount of this to their night and morning routine. Again, they have the stimulation of direction, of company, of competition and also of play.

It is not uncommon for patients to be injured by improperly planned gymnasium work and unless the physical director is thoroughly competent, it is best to keep in touch with the patient and what he is doing. Even when one is sent to a competent physical director, the physician should have a general understanding with him as to what is to be done.

When an individual unused to gymnasium work takes up this line of activity, he should be occasionally examined, particularly his heart, to see that no ill effect is being produced.

Walking. This is a form of activity that is available to almost every one and is indispensable. The majority of individuals require a certain amount of direction in this also, and it is necessary to individualize. For one unaccustomed to much of this form of exercise, it should be carefully regulated. It is better to begin with a few blocks and gradually to increase. About three to five miles per day will meet the average requirements.

Patients must be supervised not only as to distance, but as to gait, carriage, breathing, clothing and shoes. It is certainly better to walk where the surroundings will be pleasing and interesting, if possible, such as parks and country lanes, in contra-distinction to the congested sections of the city.

Recreation. This includes not only exercise, but mental diversion. This should be supervised with particular care, and violent games, such as tennis, not undertaken until the patient is in a condition to benefit by them.

Swimming is a recreation which can be begun early and is highly beneficial.

Golf is a desirable form of recreation and is suited to individuals of almost any physical status.

One of the important considerations is not only to see that the patient does not over-exercise, but to see that a certain amount of regularity be maintained. It is not of advantage for the average patient to play tennis only once or twice a month and then play it violently.

Another important consideration is to see that the patient receives the proper after-care. It is not wise to play tennis until perspiration is induced and then to lie on the ground to cool off. Where possible, active exercise should be followed by a bath and rub down and in most cases by a period of rest.

There are other forms of recreation that should always be considered, such as hunting, fishing, boating and kodaking.

The following fragment will illustrate how orders may be written:

"Get up at 7 A.M., take ten minutes setting-up exercise followed by a cold bath and rub down, fifteen minutes walk, five minutes rest and then breakfast." I have known patients who followed this regime to eat a hearty breakfast with relish when such had been unknown to them for many years.

Among the most essential factors are individualization, definite system, persistence, patient supervision and careful observation of results.

Diet.—In increasing weight and strength, diet is an indispensable factor; in fact, usually it is the most important.

Individualization is necessary and no hard and fast rule can be laid down that will apply to all cases.

When patients are markedly undernourished, it is naturally desirable to pay more attention to a high caloric diet than is the case when they are very little, if any, below the standard. The influencing factor is the object sought. When it is desirable to markedly increase the weight, diet is of great importance. When the object is rather to increase good-feeling and efficiency, it may be only necessary to see that the individual gets enough food to hold his state of nutrition and avoids those things that might work a disadvantage.

As to whether or not we give the patient a definite diet list depends to a certain extent on the conditions under which the patient is living, the status of the patient's condition and the object sought. In the majority of cases it is desirable to begin with a definite list that may be added to or subtracted from as indications arise. It is usually best to make this preliminary list comparatively small, particularly when there is any reason to suppose that the digestive ability may be impaired. There are several advantages to this. It limits the eating to food of definite value. By their omission, such articles of food are excluded from the diet as might either do damage or take the place of worth while food. A diet list gives the physician better control of the whole situation. It sometimes seems that a patient with anorexia, particularly the pampered, petted type of individual, may actually acquire a better appetite through the capricious desire for articles of food that they are not permitted to have.

As the digestive ability of these patients is established, the diet should be increased until finally the last stage of the written diet list is reached; that is, where the patient is allowed to take anything except certain articles that are definitely prohibited. In many cases this type of list may be best used from the beginning of treatment. This list should be compiled with some regard to the patient's past habits; for example, when one has been in the habit of taking eight to ten cups of coffee per day the maximum allowance should be stated. For the girl who is much given to eating pickles, this article is limited or prohibited.

Among the articles of diet that are of most advantage and will often be the nucleus in the process of building up a diet list, the following may be mentioned:

Water, milk, butter, cream, cream cheese, cream soups, milk shakes, gelatin, custard, soft eggs, cereals, breads, potatoes, yams, fruit, steak, veal or mutton chops, poultry and bacon.

It is usually desirable to have the patient make up a list of things that he would relish and submit this from time to time, and the physician can add certain of the desired articles to the diet.

The sheet-anchor in this form of treatment is milk. In fact it is often extremely difficult to obtain very satisfactory results in increasing weight unless the coöperation of the patient can be obtained in the taking of a fairly large amount of milk. This may be employed in any one of several ways. One of the most satisfactory is to let the patient eat three meals per day and two hours after each meal take a milk-shake made as follows:

1 whole fresh egg.
1 heaping tablespoonful of malted milk.
1 tablespoonful of chocolate syrup.
Cracked ice.
Milk to fill shaker.

Three of these milk shakes, properly made, will use about two pints of milk. This formula has a value of nearly 400 calories and it can be readily seen that if the daily diet is increased by three times this amount in easily digested food, results are likely to follow.

Sometimes the value of this milk-shake can be increased by using part cream and part whole milk. They should not be made too sweet as some will tire of them more readily on that account. Sometimes the milk-shake can be taken to better advantage if crackers or some other light food is allowed with it.

Another way to give milk is to have the patient take a pint with each meal. It should be taken in addition to other food and not in place of it. To best effect this, water, iced tea, lemonade and such drinks should be excluded from the meal and milk used in their place. It is best not to begin drinking the milk until towards the close of the meal. Another plan is to put a pint of milk by the plate each meal, the patient drinking what he desires during the meal, and the rest an hour afterwards.

At the evening meal the milk may be omitted, provided it be taken before retiring. It is recognized that the claim has been made that this does not lend itself to good digestion. Practically, the results seem to be excellent.

Another plan is to use buttermilk from which the fat has not been removed or with the proper amount of cream added.

The average patient can almost always be given three pints of whole milk and half a pint of cream per day. The cream can be used either by adding it to the milk, or by using it on the food. Sometimes this amount of milk can be considerably increased, not only with comfort, but with actual relish.

Sometimes it is of advantage to jump from one of these plans to the other at occasional intervals to give more variety, although most patients can take any reasonable amount of milk indefinitely. In fact, in the majority of cases, the longer they take it the more it becomes an essential part of their diet.

A fault that is frequently found, particularly in children, is the habit of eating before meals and in this case to obtain results it is desirable to emphasize the fact that a sufficient length of time should elapse, at least three hours, between the taking of any food and the next meal. For example, where the patient takes breakfast at eight, lunch at one and dinner at six, the extra feeding should be given not later than 10 A.M. and 3 P.M. Between the evening meal and bed time any easily digested food can be taken.

It is often found necessary particularly for children to restrict or even temporarily eliminate sweets, as these often interfere with the appetite for other food.

Special diet may be ordered for the correction of such conditions as constipation (See Constipation, page 481), hyperchlorhydria (See Hyperchlorhydria, page 458) and hypochlorhydria (See Hypochlorhydria page 452).

Medication.—There is no specific medication for this treatment. Where a definite disease is found that is interfering with the patient's well-being, it must be removed; aside from this, the cases are treated symptomatically.

Laxatives might be mentioned here as they are sometimes needed. Excessive elimination, of course, should never be permitted, and it is often desirable to restrict the patient that has been over zealous in the use of purgatives. Saline purgatives are usually undesirable. Olive oil is the most satisfactory agent and will meet the requirements in the majority of cases. It is not only laxative, but highly nutritious. It is best given in one dose at bed time as it then does not interfere with appetite or digestion.

Constipation may sometimes be relieved by drinking a cup of hot water early in the morning. If for any reason these can not be used or do not meet the requirements, cascara is the next choice. It is not only laxative, but, if given in small doses three times a day, seldom gripes and probably has some advantage as a simple tonic.

Constipation almost always can be corrected by proper diet and exercise alone.

Tonics. A great many of these cases of under-nutrition show a certain amount of anemia and a tonic, at least for a time, may aid the other measures of treatment.

Some of the most satisfactory are the simple, pleasant combinations put up by the various pharmaceutical manufacturers. The patient does not resent taking them, in fact they are often relished. These are too numerous to mention all, but among the most satisfactory are: Glycerophosphates compound (without sugar), peptonized glycerophosphates, phospho-licithin and metatone. Often arsenic may be added to these to advantage. Sometimes other desired agents may be added at the time of taking, as diluted hydrochloric acid.

Psychotherapy. In a fairly large percentage of the cases under discussion, the psychic element is one of large importance. We are trying to get this patient into a condition of better feeling and increased efficiency. We are often contending against loss of appetite, faulty habits, faulty mental processes, neurasthenia, and mental depression. One of the most difficult tasks is to maintain unqualified cooperation. There is nothing that affects all of these conditions more favorably than confidence. It is necessary to use every legitimate means to give these patients the benefit of the greatest amount of encouragement.

There are few phases of medical practice in which a physician has a better opportunity to display his powers in the matter of suggestion. The most impressive factor is a gain in weight and it is seldom that trouble in maintaining cooperation will be experienced when the scales are telling a cheerful continued story. It is very common to have a patient come into the consulting room in a state of profound dejection and on finding that he has gained a pound or two, go out with renewed enthusiasm and feeling like a different individual.

It has been possible to give only an imperfect outline of this subject, but it is one of maximum importance and one in which long sustained patience and intelligent effort will be abundantly rewarded.

DISEASES OF THE BLOOD

SECONDARY ANEMIA

General Statement. Definition.—This is a condition of the blood in which there is a reduction of the red cells and hemoglobin, due to some primary pathological process. Many synonyms have been used, such as symptomatic anemia and simple anemia. Effort has been made to divide this condition into various groups; for purposes of study the most logical of these is that into posthemorrhagic; infectious or toxic; and trophic. Some use such subdivisions as acute posthemorrhagic and chronic posthemorrhagic. These subdivisions are relatively unimportant and where the primary cause can be located it is better to consider it as the anemia of that particular disease, for example the anemia of malaria or the anemia of tuberculosis.

Incidence.—There is no group exempt from this type of involvement.

Etiology.—The causes of secondary anemia include practically the entire field of pathology. Almost any disease or subnormal condition may have as a symptom a reduction in the quality of the blood. Among the most common causes, however, are the following: Hemorrhage, such for example as that following trauma, menorrhagia, metrorrhagia, hemorrhoids, gastric or intestinal ulcers or anything that entails a sufficient loss of blood, either acute of chronic. Acute infectious diseases, such as rheumatic fever, scarlatina or malaria. Chronic foci of infection, as in the tonsils, teeth, gall-bladder or pelvis. Certain chronic diseases, such as nephritis, syphilis, tuberculosis, cancer, intestinal parasites. Malnutrition. Chronic poisoning, as with lead or mercury. Many other factors too numerous to mention often have to be considered in the etiological diagnosis.

Course and Prognosis.—As this condition is only a symptom of some other abnormal process, the course and outcome depend entirely upon the primary cause, the promptness with which it is recognized, and its amenability to treatment.

Symptoms and Diagnosis.—In the study of this condition it must be borne in mind that it is merely a symptom; therefore, the evidences will depend largely upon the underlying cause, and often this so masks any evidence that might be occasioned by a moderate amount of anemia that it may not be recognized unless particularly sought for. Among the symptoms that may result directly from a simple anemia are the following:

Weakness. The patient is easily fatigued, there is a reduced ability for sustained effort.

Respiratory Symptoms. There may be shortness of breath, rapid respiration, or a tendency to sighing.

Cerebral Symptoms. Among these are tinnitus aurum, headache and vertigo.

Nervous Phenomena. There may be restlessness, loss of mental efficiency, insomnia, a tendency to drowsiness or melancholia.

Gastro-intestinal Symptoms. These may include anorexia, dyspepsia, constipation or flatulence.

Pallor. This may be noticeable from the appearance of the skin or only evident upon examination of the conjunctiva, the mucous membranes of the lips or the color of the nails.

Edema. When present this is usually of the afternoon type.

Circulatory Symptoms. There may be an increase in the size of the heart, increased pulse rate, venous pulse, lowered pressure, palpitation, or the so-called hemic or functional murmurs.

Laboratory. This is the evidence of definite value in making a diagnosis. There is a more or less uniform reduction in the hemoglobin and in the number of erythrocytes. In evaluating a reduction in hemoglobin it should be remembered that climate and other factors must be considered; for example, the hemoglobin of those living on the Gulf Coast averages considerably lower than those living on the Great Lakes.

Differential Diagnosis.—Of particular importance is the elimination of chlorosis and pernicious anemia. This is done by an investigation of the history of the case and the general condition of the patient, particularly from the standpoint of establishing a cause for secondary anemia.

In chlorosis there is a reduction in hemoglobin giving a low color index. In secondary anemia the reduction in the hemoglobin and red cells is more nearly parallel, resulting in a color index that is nearer normal. In chlorosis there are not the etiological factors of secondary anemia, there is a tendency for chlorosis to occur in young women at about the age of puberty and there is often the greenish discoloration of the skin.

In pernicious anemia there is a difference in the history of the case. The reduction in red blood cells is out of proportion to the reduction in hemoglobin, giving a high color index. Other more or less characteristic blood changes develop. Later in pernicious anemia there usually develop evidences, such as purpura and diarrhea. The main difficulty is not so much in establishing the fact that it is a secondary anemia, as in establishing the etiology of the condition.

Prophylaxis.—This includes the proper management of all disease processes. The possibility of anemia should be borne in mind and should it develop, special effort for its correction may often be made to advantage.

Treatment.—The principal consideration is finding the cause; the next, is removing it. If a definite disease, it should be treated; if a focus of infection, it should be eliminated; if a faulty manner of living, it should be corrected.

General Care.—The measures to be adopted will depend largely upon the disease causing the symptoms and often the treatment of the causative disease will be all that is necessary for the correction of the anemia. Rest, exercise and recreation or the proper balance between these are of major importance. If the degree of anemia is marked, there may be sufficient disability to require a period of absolute rest; if it is slight, it may be only necessary to lay particular stress upon outdoor exercise and recreation; the patient should, of course, have a sufficient amount of sleep.

Baths and Massage. These are valuable in improving the general condition. Unless contra-indicated, the cold bath or the hot bath followed by a cold shower, then a rubdown with a rough towel, will probably meet the requirements best. Special massage may at times be of value.

Elimination. Particular attention should be given to securing sufficient intestinal elimination; but purging is to be avoided. The idea is to maintain sufficient elimination to promote digestion and to prevent distension or the absorption of toxic material.

Climate. At times climatic treatment is a valuable aid to recovery; there is no specific climate and comfort and recreation are considerations that must be weighed in selecting a place of change. As a rule a moderate altitude in the open spaces, such as the mountain resorts or the Great Lakes, meet the requirements well.

Diet.—This, of course, must depend largely upon the general condition of the patient from the standpoint of disease, his state of nutrition, and his digestive ability. There is no specific diet and, unless contra-indicated, the patient may be allowed considerable latitude. The use of certain foods, as fresh milk, fresh eggs, fresh red meats (beef and mutton), ripe fruits and fresh vegetables (such as spinach, asparagus, etc.) should be encouraged. It is usually better to avoid highly seasoned foods and such articles as pickles and vinegar dressings.

Medication.—The two drugs of particular importance are iron and arsenic. Iron should be given in some form that will not injure the teeth, as it has to be continued for a considerable period of time to be of value. The following prescriptions illustrate some of the most common methods of ordering these drugs:

℞

Pil. Ferri Carb. (original bottle)	no. c	

Sig.—Two (2) after each meal.

℞		or
Arseni Trioxidi,	gr. ij	|13
Ext. Nuc. Vom.,	gr. x	6|00
Mas. Ferri Carb.,	gr. ccc	20|00

M. ft. cap. no. l

Sig.—One after each meal.

℞ (For a child 10 years old)		or
Liq. Potas. Arsen.,	f ʒj	4|0
Liq. Fer. Pep. cum Mang.,	q.s. Oj	480|0

M.

Sig.—Two (2) teaspoonfuls in water after meal.

Special Treatments.—Among these are the administration of iron or arsenic by needle, or the two may be combined. In extreme cases blood transfusions have been resorted to with success.

PERNICIOUS ANEMIA

General Statement. Definition.—Pernicious anemia is a primary disease that is evidenced principally by a marked reduction in the number of red blood cells, this being out of proportion to the reduction in hemoglobin, and giving rise to a high color index. There are other changes that are more or less constant. The disease is sometimes spoken of as Addisonian anemia. Other synonyms have at times been employed.

Incidence.—In this country, at least, the condition is more commonly found in males. It develops usually about middle life, the majority of cases occurring between thirty and forty-five.

Etiology.—Many theories have been advanced as to the cause of this disease, but nothing definite is known at this time. Many conditions have also been suggested as contributing factors, such as lowered nutrition and excessive exposure, but all are still problematical.

Course and Prognosis.—The disease till recently has been almost, if not quite, uniformly fatal. The course may be marked by many exacerbations, remissions, and apparent intermissions. It is probable that the average duration of life after the onset of the disease has been somewhere between two and three years. There is a rapidly fatal form known as aplastic anemia that is not included here.

Symptoms and Diagnosis.—In arriving at a diagnosis by evaluating the signs and symptoms presented, it must be borne in mind that a condition which affects the quality of the blood, as does the one under discussion, will naturally interfere with every organ and function of the body. It is true, therefore, that the possible symptoms are almost unlimited.

History. The history of the case is of importance, particularly as to the duration of the symptoms and as to whether there has been any condition that would give rise to a secondary anemia.

Onset. This is usually gradual and it is hard for the patient to give a definite statement as to when the condition began. It is probable that most of the cases that report a sudden onset are really those in which the condition was not discovered until it was unmasked by some acute exacerbation.

Physical Disability. There is weakness, the patient being easily tired and incapable of sustained physical effort.

Temperature. There is a fairly constant tendency to elevation of the temperature, particularly late in the disease.

Respiratory Symptoms. There may be dyspnea, a sense of air hunger, increased respiratory rate, a tendency to sighing, and difficulty of speech.

Circulatory Symptoms. These may include rapid pulse, periods of palpitation, enlarged heart, various cardiac murmurs, and a venous hum.

Gastro-intestinal Symptoms. These are among the most constant findings. The mouth and tongue become sore and are a source of much inconvenience; for this reason it is at times confused with pellagra. There may be anorexia or eccentricities of appetite. There is a tendency to nausea and epigastric discomfort; this is probably explained by the fact that most of the cases have a marked reduction in hydrochloric acid and pepsin. There may be constipation or diarrhea though usually the tendency is to hyperactivity of the bowels, at least late in the disease.

Neurological Phenomena. There may be a tendency to nervous instability, with pronounced irritability. There may be drowsiness or periods of insomnia. The intellectual efficiency is markedly lowered. Headache is frequent. It might be mentioned here that in many cases the patellar reflex is lost.

Skin. The skin shows pallor and may assume a lemon yellow tint which at times is marked. The anemia at first may be evident only on examination of the mucous membranes and nails.

Nutrition. The state of nutrition is usually surprisingly good though there is a tendency to flabbiness of the muscles.

Edema. This is nearly always present at some stage of the disease, and may appear early.

Hemorrhage. There is a decided tendency to hemorrhage, either as menorrhagia, metrorrhagia, epistaxis, intestinal hemorrhage, subcutaneous hemorrhage, or, in fact, bleeding involving practically any part of the body. The eye grounds are often early affected in this way.

Liver and Spleen. The liver and more especially the spleen may be enlarged.

Bones. There is a tendency to sensitiveness of some of the bones.

Laboratory. It is the laboratory report that establishes the diagnosis. The outstanding characteristic, as previously stated, is the low red cell count with a high color index, and the presence of many abnormal cells.

Differential Diagnosis.—Contrary to the usual impression there is sometimes much difficulty in some sections in differentiating pernicious anemia from pellagra. This applies particularly to those cases seen early or that have had the benefit of treatment. The history of the case, particularly with regard to periodicity (pellagra shows a remission in winter and exacerbation in summer) is of advantage, but the carefully made blood picture is often the only evidence that can establish a differential diagnosis.

In chlorosis there is a low color index, with a comparatively high red cell count, there is also a tendency to a greenish discoloration.

More convincing than anything else are the age and sex of the patient, chlorosis always affecting young girls, pernicious anemia practically never being found in this age-sex group.

Secondary anemia shows a tendency to uniform reduction in the red cell count and the hemoglobin, usually giving a normal or slightly sub-normal color index. There is also a history in most cases of some primary cause.

Leukemia and some other conditions are sometimes confused with it but may be differentiated by a complete blood picture and physical examination.

Prophylaxis.—As the etiology is unknown there are no suggestions of value for prophylaxis.

Treatment.—In taking up the management of these cases it is best to face the fact that the ultimate prognosis is unfavorable, also that even under the most favorable conditions the patient must be prepared for an extended period of supervision. It is well to have this understood by responsible members of the family from the very beginning. The extent to which the patient should be taken into the physician's confidence in these matters will depend upon circumstances. While the consensus of opinion is that the disease cannot be cured, it is equally certain that life can be prolonged and the patient made more comfortable. Much depends upon individualizing these cases, and exercising tact in the management of every detail of their lives.

General Care.—Rest is essential; the degree of rest must depend upon the requirements of the particular case. Many of them have years of at least modified activity, and it is hardly fair to make it a uniform rule to keep such patients in bed. During periods of exacerbation rest in bed will certainly be necessary. The rest should be mental and physical, and every effort made to keep the patient as comfortable as possible. Mental diversion and recreation should be provided as the progress of the case permits. Particularly for those cases showing air-hunger, fresh air is essential. In cold weather care must be exercised to provide proper warmth, as there is a decided tendency to chilliness. Proper bathing is indicated; and modified massage contributes to the comfort of the patient and may at times be of value. Massage should be discontinued when there is a tendency to hemorrhage. Intestinal elimination should be maintained without exhausting the patient by purging. This can be affected by the use of simple agents such as olive oil, liquid petrolatum, or some other mild laxative. Colon irrigation will be discussed later.

Diet.—There seems to be no particular diet that is either indicated or contra-indicated except by the digestive ability and general condition of the patient and the use of purin-rich foods as will be discussed under treatment. At times it may be necessary to markedly restrict the amount of food. Many have advised the milk and vegetable diet while others recommend the high protein. It is probably best in the majority of cases to give a simple, easily digested, well balanced diet except under those conditions where there are special indications to the contrary. The reduction in hydrochloric acid that sooner or later occurs should be borne in mind. This will be discussed under symptomatic treatment.

Special Treatment.—At the present time a new plan of treatment is being employed that promises much, though it is too soon to make any definite statement as to its permanent value. This is the feeding of fresh liver. It is given rare or raw in daily amounts of 4 to 6 ounces (120 to 180 Gm.). The liver of young cattle or sheep are principally used. The results so far have been most encouraging.

General Medication.—Arsenic is the drug most used. The common form of choice is the solution of potassium arsenite (Fowler's solution). The dosage is governed by the reaction of the patient; it is usual to begin with about 3 minims (0.2 cc.) three times daily and to increase gradually till the tolerance of the patient is reached, but the majority of physicians seldom give over 8 or 10 minims at a dose. The patient should be watched for evidences of intolerance, such as edema and albuminuria. Some use the sodium cacodylate by needle, or arsphenamine or neoarsphenamine intravenously. Tonics may be given to improve the appetite or contribute to the feeling of well-being. Iron as such seems to be of no special value. Many other agents have been used, particularly bone-marrow, which is highly recommended by some.

Other Measures.—Colon irrigations have been extensively employed by some. Transfusion is certainly of value in prolonging life in some cases, and while it offers no hope of cure, it may inaugurate a remission. X-ray and radium have seemed to be of value for the same purpose. Splenectomy has been rather extensively employed; in some cases it has seemed to prolong life.

Symptomatic Treatment.—Much can be done to contribute to the comfort of the patient and no effort should be spared to prevent or relieve the symptoms that from time to time arise.

Diarrhea. This is handled very much as is diarrhea arising from some other cause. The patient should be put to bed for complete rest and the food intake adjusted. Warm colon irrigations of cooked starch water will often give relief. It is probable that paregoric will meet the requirements where definite medication is necessary, about as well as anything else.

Dyspepsia. It can usually be ascertained from a simple history of the case as to whether or not the discomfort results from a lessened gastric secretion. Where such is the case, the proper adjustment of the diet together with hydrochloric acid, or hydrochloric acid and pepsin, will give relief.

Hemorrhage. The treatment will depend largely upon the location of the bleeding point. In epistaxis the application of ice, pressure on the upper lip or applications to the bleeding point if it can be found will usually suffice. At times it is necessary to pack the nose. In hemorrhage of the bowels, rest, attention to the food intake, and application of cold to the abdomen will be of value. Various agents such as normal horse serum given hypodermically or calcium in various preparations given by mouth or intravenously may be tried. Transfusion is the one great remedy when simpler measures fail. In fact, in a general way it may be said that hemorrhage here may be treated just as hemorrhage arising from any other cause.

Nervous Symptoms. These are not usually pronounced and, when they do arise, should be treated just as the same condition arising from any other cause. For example, restlessness and insomnia may be controlled by giving small doses of bromides or barbital, as needed.

CHLOROSIS

General Statement. Definition.—This is a primary anemia characterized by certain more or less definite findings, especially a disproportionate loss of hemoglobin as compared to the total red cells. The synonym, green sickness, is sometimes employed, but should be discouraged as this manifestation is not constant.

Incidence.—The disease is peculiar to women and occurs principally at about the age of menstruation. It is often stated that blonds are more often affected than brunettes.

Etiology.—Many theories have been brought forward but at present there is nothing definitely established. The internal secretions probably play a part.

Course and Prognosis.—Under favorable treatment the disease almost uniformly progresses to a cure. The same conditions (whatever they are) may cause a recurrence; in many instances such recurrences are merely relapses of imperfectly treated cases. As a rule a complete return to normal is a matter of several months.

Symptoms and Diagnosis.—Of particular importance is the history of the case. The sex and age being favorable to the development of the disease is a primary consideration. The absence of any other condition that might account for the blood picture is of importance.

Weakness. The patient complains particularly of lowered physical efficiency and in the severe cases this may amount to almost complete disability.

Respiratory Symptoms. There is usually shortness of breath upon exertion, some increase in the respiratory rate, and later a marked tendency to sighing.

Nervous Phenomena. These are sometimes among the first evidences and may take the form of irritability, nervous instability, a tendency to excitement at slight causes or a more or less pronounced apathy. Hysteria is sometimes present.

Circulatory Signs and Symptoms. These are usually present and may include such evidences as a consistantly rapid pulse, periods of palpitation or other irregularities. There is often a functional murmur, venous pulsation, and at times the characteristic venous hum.

Gastro-Intestinal Disturbances. There may be anorexia, a capricious appetite, dyspepsia, flatulence or constipation. The tendency seems to be largely to hyperacidity with its usual symptoms. Gastric ulcers have frequently been reported in these cases.

Menstrual Disturbances. The most common is a reduction in the frequency or duration of the periods. The amount may be diminished or there may be complete amenorrhea. At times menorrhagia occurs.

Skin. There may be pallor of the skin and mucous membranes such as are found in symptomatic anemia. At times there is a tendency to a greenish discoloration, particularly about the mouth and under the eyes, though this is by no means a constant finding.

Edema. If present this is usually rather slight, though at times it may be sufficient to prevent the wrinkling of the forehead when the patient looks up (Jaffray's sign).

Many of these cases show some thyroid enlargement

Prophylaxis.—As the etiology is unknown, no definite prophylactic measures can be outlined. It may be said in a general way that this is one of the conditions that justify the claim that all people and particularly the young should be more or less under medical supervision. Here it would insure the early detection of such a condition and the prompt institution of measures for relief. It is highly probable that keeping young women in the best possible state of health may be a determining factor in preventing the development of many of these cases.

Treatment. **General Care.** Rest. To a greater or lesser extent this is naturally indicated in any condition of impaired physical efficiency. The amount of rest must depend entirely upon the condition of the patient and her reaction to activity. In the more serious cases, rest in bed is imperative, until sufficient progress has been made. In cases of mild involvement it is usually only necessary to modify the activity. As a rule eight or nine hours in bed at night with a period of rest in the middle of the day and the avoidance of too much exercise will meet the requirements.

Fresh Air and Sunshine. One of the main objectives is to have the patient in the best possible state of health. It stands to reason that where there is no contra-indication, this can be aided by a considerable amount of outdoor activity in the fresh air and sunshine.

Recreation. For generations doctors have been accustomed to sending these patients to the country where walking, swimming, horseback riding, etc., can be prescribed in sufficient amounts. The same plan is justifiable today, though it is seldom necessary to send an individual away from home to secure the required recreation. Any form of outdoor activity that comes within the physical ability of the patient may be employed in proper amount. It is particularly desirable to have this activity in the form of some pleasant recreation as the effect is naturally better.

Change of Climate. At times change of climate for a sufficient period may be of decided advantage.

Baths and Massage. These are of value and probably the best form is the warm bath followed by a cold sponge or shower and a brisk rubdown with a rough towel.

Diet.—The amount and character of food must depend very largely upon the state of nutrition and the digestive ability of the patient. In most cases it is only necessary to prohibit articles that are undesirable such as pickles, highly seasoned dishes, vinegar dressings and excessive sweets. Among those to be increased are fresh milk, fresh eggs, fresh red meats, good fruits and fresh vegetables. Some foods such as oatmeal and spinach may be particularly recommended for the iron content.

Symptomatic Treatment.—In a large percentage of cases the return to normal is so prompt under the specific treatment that it is hardly necessary to give attention to symptoms. Among those that occasionally require attention are the following:

Anorexia. This may usually be controlled by the elimination of sweets, giving special attention to attractive table service and the employment of exercise, recreation and mental diversion. At times simple tonics such as the glycero-phosphates (without sugar), tincture of nux vomica or the elixir of iron, quinine and strychnine may be used to advantage.

Constipation. This may probably best be combated with cascara, should definite medication be needed. In most cases laxative foods, exercise and regular habits meet the requirements.

Nervous Phenomena. These seldom require treatment, occasionally small doses of bromides may be used for temporary relief.

Circulatory Disturbances. These are probably best controlled by rest.

Specific Treatment.—Many and varied drugs have been recommended. It is probable that only two are worthy of discussion, that is iron and arsenic; as a rule the requirements are well met by the use of iron alone. The form of almost universal choice is the carbonate, and this is usually given in the form of the official pills, which may be ordered as follows:

℞
Pil. Ferri Carb.,
(original bottle) no. c
Sig.—Two (2) after each meal.

Some recommend giving one pill after each meal the first week, two the second week and three the third week, continuing this amount until the desired effect has been obtained, when the drug may be gradually withdrawn. It will be noted that an original bottle was ordered, these pills come in bottles of 100, 500 and 1000. By prescribing the original bottle of 100 the patient gets a better product than if a smaller amount is dispensed out of a previously opened container that has been on the shelves of the druggist for an indefinite time. Some prefer that the preparation be ordered so that the carbonate will be made in the stomach of the patient through the chemical reaction of the drugs; this may be prescribed as follows:

℞

		or	
Ferri Sulph. Exsic.,	g. cl	10	
Sodii Carb. Monohyd.,	g. cl	10	

M. ft. cap. no. 1
Sig.—One after each meal.

Where it is desired to give arsenic or arsenic and some bitter tonic the prescription may be written as follows:

℞

Strych. Sulph.,	gr. j		06
Arseni Trioxidi,	gr. ij		12
Mas. Ferri Carb.,	g. ccc	20	00

M. ft. cap. no. 1
Sig.—One after each meal.

Many of the pharmaceutical houses have these on the market in the form of soft capsules or coated pills.

Of course there are many advocates of the administration of iron by needle. The soluble citrate is put up in sterile ampules for this purpose. Some also give the arsenic by needle, and iron arsenite has been rather extensively employed in this way. In the vast majority of cases the simple pills of ferrous carbonate is all that is necessary to meet the requirements. In prescribing other combinations it should be borne in mind that sometimes there may be a decided laxative tendency and the patient should be instructed to report any unfavorable symptoms. The simple carbonate seems at times to be constipating, this can be corrected as previously outlined in the symptomatic treatment.

HEMOPHILIA

General Statement. Definition.—Hemophilia is an hereditary disease characterized by a marked tendency to prolonged bleeding, once bleeding has started.

Incidence.—As the condition is inherited, it is likely to be manifested early in life, sometimes being evident at birth. Males are principally affected; some authorities even going so far as to claim that females are exempt. Virchow estimated the percentage as high as seven males to one female. It has been fairly well established that females transmit the condition to their male offspring, but are usually immune themselves. On the other hand, the males are affected with the disease but do not transmit it to posterity. It is claimed that blonde types are more susceptible than others.

Etiology.—The cause is unknown, many theories have been suggested, such as imperfect vascular structure or abnormal blood content. It is probable that more than one factor is operative.

Course and Prognosis.—Where the susceptibility is pronounced, the mortality is high. If the individual reaches adult life there is a tendency for the condition to subside to a greater or less extent.

Symptoms and Diagnosis.—Practically the only symptom of value is the tendency to excessive bleeding. This may be shown as the bleeding from a slight wound persisting for an almost indefinite time or there may be hemorrhage without known injury, such, for example, as from the nose or uterus. In establishing a diagnosis, an analysis of the history is of most importance. This investigation should establish the presence or absence of a family tendency, and also whether the condition has been present from infancy. The exclusion of other causes of bleeding is of importance, also a careful evaluation of the character of the hemorrhage, especially whether there was a tendency to persist in spite of the usual measures of treatment.

Laboratory. A blood examination will give findings depending largely upon the condition of the patient. After marked bleeding there will be found all the evidence of anemia and of the effort on the part of the structures involved to repair the damage, as shown by the various types of immature cells. The bleeding time is markedly prolonged, the coagulating time is also prolonged, but the clot when formed shows a tendency to contract.

Differential Diagnosis.—The main condition from which this will have to be differentiated is purpura. The history of heredity and the fact that the condition has been present since birth, with the addition of the laboratory findings, will usually leave little doubt. It should be remembered that in hemophilia the blood platelets do not show the marked tendency to reduction as in purpura. In purpura the clotting time is not so markedly delayed and the clot when formed does not contract.

Prophylaxis.—This should probably be considered from two standpoints:

First. The prevention of the condition, which is purely a matter of eugenics.

Second. The prevention of hemorrhage in a susceptible individual.

The marked tendency to transmit this distressing tendency to the offspring should certainly have due consideration in the matter of marriage and parenthood.

In protecting the susceptible individual from everything that might cause bleeding, one should prohibit surgery both general and dental, and such recreations and occupations as carry much chance of injury. Even violent physical exertion may precipitate trouble.

Treatment.—It must be said in the first place that little can be done in the way of relieving the hemorrhagic tendency. Various agents have been suggested such as preparations of the kidney, suprarenal gland, thyroid and thymus.

When hemorrhage occurs, rest is imperative, and this rest should be absolute, both mental and physical. General comfort naturally contributes to this. It may be necessary at times to lend aid by the use of sedatives as codeine, bromides, or barbital.

Calcium in its various forms is probably more used than any other drug. The salt of choice seems to be the lactate, and this is used as for other forms of hemorrhage. The average adult dose is about 15 grains (1 Gm.) every four hours until the desired effect has been produced or its inefficiency demonstrated. The use of calcium should be carefully checked up by a blood investigation and the drug discontinued promptly, or at least much reduced in amount, as soon as a satisfactory result is obtained.

Various proprietary preparations may be tried and sometimes are of benefit. If the loss of blood has been sufficient to cause anemia, iron may be used just as in treating anemia from other causes.

The various serums have been extensively used. For acute emergencies or when other measures fail transfusion should always be resorted to. It also serves to meet the deficiency resulting from the loss of blood.

Local Measures. These are just the same as for bleeding from other causes, except that as a rule the results are less satisfactory. Compresses, styptics, packing, etc., should be employed as necessary.

PURPURA

General Statement.—This condition should be considered rather as a symptom than as a disease. The wide range of diseases with which it may be associated will be discussed under the head of Etiology.

Definition.—Purpura is a condition characterized by the extravasation of blood in the skin; often under the mucous membranes and into the various structures of the body. Many classifications are in use. In a general way the effort has been made to group these conditions under two heads: complicating purpura, where a definite causative condition can be established, and idiopathic purpura, where no etiological factors are evident. The active or malignant forms of the disease are sometimes spoken of as fulminating purpura. Some have mentioned a cruciform purpura; that is, the extravasations appear in the hands and feet somewhat corresponding to the locations of the wounds caused by the crucifixion of Christ; it is highly probable that these cases have resulted from intentional trauma. Probably the best classification is that which divides the disease into four groups, as follows:

1. Purpura Simplex, or that mild form with small lesions principally in the lower extremities with few or no constitutional symptoms and no other extravasations of blood.

2. Purpura Rheumatica. There is involvement of the joints, usually with considerable constitutional evidences and cutaneous hemorrhages. The skin lesions are principally on the lower extremities and abdomen, the spots being, roughly, from one or two up to ten or fifteen millimeters in size. There may or may not be extravasations other than those of the skin.

3. Purpura Hemorrhagica, a serious form of the condition characterized by more general distribution of the cutaneous lesions, the spots sometimes attaining very large sizes, and associated usually with many other marked manifestations of the disease and very often by extravasations other than those of the skin.

4. Henoch's Purpura, the gastro-intestinal type, characterized by involvement of the mucous membranes of the digestive tract. This is usually associated with marked general disturbances and very often with other extravasations into or from other structures.

Incidence.—Purpura simplex is more apt to develop among the old or debilitated; purpura rheumatica among those of the rheumatic age; that is, later childhood or early adult life. This is a rare condition. Purpura hemorrhagica may develop at almost any period of life, but is most common in middle age when we find such conditions as pernicious anemia and leukemia.

Etiology.—McMahon's etiological classification is probably the most complete among those yet offered. It is, in general, as follows:

1. Infectious diseases such as tuberculosis, malaria, typhoid and scarlatina.
2. Cachexia, such as that resulting from malnutrition, senility or malignancy.
3. Abnormalities of the blood, such as pernicious anemia and the leukemias.
4. Nervous diseases, as tabes and myelitis.
5. Intoxications, such as (a) from iodine, quinine, chloral, and salicylates; (b) biological, as from serums or vaccines.
6. Mechanical, such as trauma or embolism.

Course and Prognosis.—This depends entirely upon the causative condition, the particular type and the extent of the involvement. In a general way it may be said that purpura simplex usually clears up in a few weeks. Purpura rheumatica runs a more protracted course and is very subject to relapses. The exacerbations in the cases, caused by serum, while extremely violent, are usually of short duration. It should be borne in mind that the purpura resulting from serum does not always assume this form. Purpura hemorrhagica is a serious condition not infrequently terminating in death, often due to involvement of the kidneys or hemorrhage into the brain or other structures. Henoch's purpura is a serious type of the condition which fortunately is rare. It runs an irregular course, the outcome of which depends upon the extent of the involvement and the condition of the individual.

Symptoms and Diagnosis.—The main consideration is to determine the cause. As often evidences of the causative condition may be overshadowed by direct and indirect manifestations of the hemorrhagic process, the history of the case is of paramount value.

Onset. The onset may be sudden or it may be gradual. Hemorrhage may be the first evidence or it may follow constitutional manifestations such as fever, malaise, and gastro-intestinal disturbances.

Hemorrhage. In estimating the extent of the hemorrhage we must not only take notice of that hemorrhage which is visible, as in the skin or mucous membranes, or of the blood that is poured out, but we must also take into consideration the evidences of invisible hemorrhage; that is, the extravasation of blood into the structures of the body. The findings of the skin have been briefly discussed under the head of Classifications. In purpura simplex the cutaneous lesions are small and confined principally to the lower extremities. In purpura rheumatica the lesions are larger in size and confined principally to the lower extremities and the lower parts of the body. In purpura hemorrhagica the skin lesions are larger, markedly irregular in size and contour, and more general in their distribution. There is a natural tendency for the lesions after a time to coalesce and to undergo the other changes characteristic of cutaneous extravasations. The hemorrhages also may occur elsewhere than in the skin. There may be gastric or intestinal hemorrhage; there may be hemorrhage from the urinary tract, from the nose, from the mucous membranes of the mouth; hemorrhage into the conjunctiva, hemorrhage into the muscles, or the various organs; all giving the special evidences of such involvement.

Anemia. This is more or less constant; it may show not only from the blood examination but there may be all the signs and symptoms of a secondary anemia from any cause. (See page 557.)

Laboratory. Blood. The findings here depend largely upon the extent and type of the condition; it may be markedly influenced by the underlying disease. Among those evidences that may be gathered from a blood examination are a reduction of red blood cells and hemoglobin, this at times being extreme. An effort on the part of nature to repair the damage may also be evident in the type of cells. The white cells may be normal or reduced. The blood platelets are greatly reduced, sometimes markedly so. The coagulation time may be normal, but is often delayed; the bleeding time is usually markedly prolonged; the blood clot does not show a tendency to contract.

Urine. The urinalysis may show direct involvement of the urinary tract, or may give some evidence of the generally impaired condition of the body; or the urine may be normal. A quantitative investigation of the renal function may often give information of value.

Differential Diagnosis.—Here again it must be borne in mind that purpura is a symptom, but even as such it may at times have to be differentiated from certain diseases, the two most common being scurvy and hemophilia.

Hemophilia gives a definite history as to heredity and occurs principally in males. There are etiological factors which can usually be proven in purpura. In hemophilia the coagulation time is more pronouncedly prolonged, the bleeding time may be prolonged, but the clot shows a decided tendency to contract. In hemophilia blood platelets are not materially reduced.

In scurvy there is usually the more direct history of dietary indiscretion. There is a tendency to a brownish discoloration of the lower extremities, and usually there is involvement of the mucous membranes of the mouth, particularly the gums, these symptoms are absent from purpura, though of course there may be bleeding from the gums.

Prophylaxis.—There are probably no direct measures of value to prevent the occurrence of this condition. The prophylaxis of purpura is the prevention of or the proper treatment of the etiological factors.

Treatment.—The principal consideration is naturally the direct attention to the underlying cause. The condition as such, however, certainly requires prompt and energetic attention, no matter what the disease process causing it. There is no specific treatment and the very multiplicity of measures suggested indicate the uncertain value of any one of them.

General Care.—Bleeding always calls for rest; this rest should be complete, both mental and physical. All factors that make the heart beat faster or with more force naturally increase the tendency to hemorrhage. The patient should be made as comfortable as possible, should be free from noise, confusion, excitement, and business or domestic worries. All company must be excluded and talking discouraged as much as possible. Proper warmth, fresh air, and other details of general care must receive attention. It may be necessary at times in order to secure rest to use sedatives such as codeine, bromides, or barbital. Proper intestinal elimination must be maintained, but active purging avoided.

Diet. This depends upon the particular conditions present. Under all circumstances food should be compatible with the digestive ability of the patient, bland, easily digested, and free from unfavorable side effects. In a general way it may be stated that such foods as milk, well-cooked cereals, toast, gelatin, and custards are satisfactory.

Medication. Calcium. This has been extensively employed and, in fact, is always a part of treatment. Some recommend small doses, as 5 grains (0.3 Gm.) of the lactate three times a day; others give large doses, as 30 to 60 grains (2 to 4 Gm.) of the lactate every three hours. Probably a good average is 15 grains (1 Gm.) of the lactate every four hours until ten to twenty doses have been taken. The chloride is also frequently employed, by mouth or intravenously.

Serums. Various serums have been recommended as that of the horse and rabbit. The one of choice seems to be normal horse serum given in doses of 10 to 20 cc. This is used subcutaneously and repeated in twelve to twenty-four hours if necessary. The most violent case of purpura rheumatica that I ever witnessed resulted from 20 cc. of horse serum given for hemorrhage from a gastric ulcer.

Gelatin. This has been extensively used by needle and many favorable reports have been made.

Other Agents. Among these are thromboplastin, hemoplastin, fibrogen, emetine (one-half to one grain (0.03 to 0.06 Gm.) intramuscular), coagulin and stypticin. A time honored treatment, and one that is still extensively used, is the tincture of ferric chloride and quinine: the usual dose is a 5-grain (0.3 Gm.) capsule of quinine and 30 minims of tincture of ferric chloride three times a day.

Non-medical Measures. For particular hemorrhage the usual simple measures should be employed. For example, in nose bleeding the use of astringents or packing the nares. For gastric or intestinal bleeding, the ice bag and the withholding of all food.

Transfusion of Blood. The use of human blood is a measure that is uniformly regarded as being at times an indispensable measure. Various methods of use have been advocated; probably the most frequently employed is the ordinary transfusion.

Treatment of Anemia. Anemia is a symptom that may require attention, particularly in convalescence. The use of iron in the general treatment or a transfusion may meet the requirements. Otherwise, should the condition of the blood indicate it, iron and arsenic may be employed just as recommended under the head of secondary anemia.

LEUKEMIA

General Statement.—For convenience the various types of leukemia will be discussed collectively. Fortunately this condition is comparatively rare; little is known of its etiology, and comparatively little can be done in the way of treatment. The leukemias will not, therefore, be considered in extensive detail, and the effort will be made to discuss the four subdivisions in one group, calling attention to differences as may be necessary.

Definition.—The leukemias are disease processes affecting principally the blood forming structures of the body, particularly the bone marrow, the spleen and the lymphatic glands. They are characterized by more or less definite blood changes, the most conspicuous of which is an increase in the number of the white cells. It is this characteristic from which the name leukemia, (white blood) is derived. The disease is customarily subdivided into two general groups; namely, the myelogenous and the lymphatic. Each of these is further subdivided into acute and chronic.

Incidence.—Fortunately this is a comparatively rare condition. The chronic leukemias are by far the most common, and of these the myelogenous predominate. While acute leukemia may occur at any age and is the type most often seen in childhood, the chronic or more common forms occur principally in middle life, while youth and extreme age are comparatively immune. It is more common among men.

Etiology.—Many possibilities have been suggested, particularly that of its being an infectious process, but nothing definite is known. There is also much uncertainty as to the importance of contributing factors, such as unfavorable living conditions, general health impairment, and acute infections.

Course and Prognosis.—The chronic forms may last for several years, being marked with exacerbations and remissions, finally terminating fatally. The myelogenous form seems to be more amenable to treatment and, therefore, to be more marked in its periods of relief. The acute types are rapidly fatal.

Symptoms and Diagnosis.—Any condition affecting the blood and the various structures of the body as does the one under discussion, may give rise naturally to such a multiplicity of symptoms as to make a detailed discussion here impracticable.

History. An analysis of the history is naturally of much importance in establishing a diagnosis. This will include the mode of onset, a careful investigation of which will usually convince the observer that the patient suffering from the chronic form has been ill for months before some outstanding discomfort sent him in search of medical advice. The acute forms may begin rather abruptly.

Local Discomfort. Clinicians agree that the symptom usually causing the patient to seek medical aid, particularly in the myelogenous form, is discomfort in the upper left abdominal quadrant, resulting from spleen enlargement. This may be merely a sense of heaviness and general discomfort or there may be more or less actual pain.

Weakness. Weakness or loss of physical efficiency is also one of the early manifestations of the disease.

Respiratory Symptoms. There may be dyspnea in any form of the disease; in the chronic myelogenous type, particularly, the glandular enlargement may give rise to marked pressure symptoms. Late in the disease anemia is a contributing factor.

Circulatory Symptoms. There is usually an increase in the pulse rate. There may be periods of palpitation, some dilation of the heart, and murmurs.

Nervous Phenomena. There are no outstanding nervous phenomena peculiar to this condition. As the pathologic process develops, there may be such symptoms as restlessness, irritability, insomnia, headache or stupor.

Gastro-intestinal Symptoms. These are many and varied; such, for example, as anorexia, dyspepsia, flatulence, diarrhea and intestinal hemorrhage.

Fever. There is usually fever; late in the disease it may rise to considerable heights, particularly in the acute form of involvement.

Hemorrhage. There is a decided tendency to hemorrhage. This may include bleeding from the mucous membranes such as the nose, mouth, stomach and intestines. There may be more or less purpura or hemorrhage in the various organs of the body. There may be impairment of the vision and hearing, as a result of hemorrhage in the structure involved.

General Appearance. The appearance of the patient may be very misleading as there is a tendency for the state of nutrition to be fairly well maintained, sometimes even late in the disease. Sooner or later there is enlargement of the spleen, liver and lymphatic glands. There is abdominal enlargement, a cyst sometimes contributing to this. The skin sooner or later gives evidence of anemia, many having described a special coloring such as a grayish appearance. Pressure from enlarged structures may cause an anxious expression and give all the evidences of interference with the respiratory function. The skin may show any one of a great variety of lesions, none of which are characteristic enough to be of much diagnostic value.

Glands. Particularly in the lymphatic type of the disease there is a general enlargement of the lymphatic glands of the body, those of the neck, groin and axillæ are most involved. The abdominal and thoracic glands also partake in this and give rise to various subjective symptoms. The spleen is markedly enlarged, particularly in the myelogenous type of the disease. It may extend as far as the pelvic brim and a well defined notched border can usually be distinctly palpated. The liver is enlarged but not to the same extent. There may may be some tenderness upon pressure over these structures, as well as over the long bones.

Laboratory. It is here that the evidence is gathered that makes a definite diagnosis possible. The findings are too extensive and varied to be discussed in detail here. The student should be referred to the special laboratory guides. It is sufficient to say that the outstanding findings are the marked increase in the white cells of the blood and the great number of abnormal forms that are present. In the myelogenous type, the myelocytes may constitute from 30 to 50 per cent of the total white count. In the lymphatic, the mononuclear lymphocytes may reach 90 per cent or over of the total white count. Under average conditions the white count runs from 100,000 to 500,000 or even much higher. Sooner or later there is a marked reduction in the total red cells and in the hemoglobin. It should be remembered that the blood findings may be largely influenced by treatment or by some acute process being superimposed upon the chronic disease.

Differential Diagnosis.—In a typical case seen under average conditions, there is probably no chance of making an error in diagnosis by anyone even fairly well trained in laboratory technique. When a careful general investigation is added to this, there is practically no difficulty experienced. When the case is seen during the existence of a change wrought by treatment or by any other associated disease, an investigation into the history or previous conditions or the continued supervision of the patient will clear up any doubt.

Prophylaxis.—As previously stated, nothing definite is known as to etiology; the same statement will apply to prophylaxis.

Treatment.—As previously stated, it is probable that this condition is uniformly fatal. Efforts at treatment are directed more to prolong life and contribute to comfort. In the acute forms of the disease very little, if anything, can be done; in the chronic forms, months or years may be added to the life of the individual.

General Care.—Under all circumstances general care is of much importance. Rest is naturally a necessity; the degree to which this should be carried out must depend upon the condition of each individual. Their affairs should be so arranged as to give them periods of absolute rest in bed during the periods of exacerbation of the disease, and to allow them modified activity when it seems justifiable. Proper warmth in cold weather, sufficient fresh air and sunshine, have their place in contributing to favorable progress. These patients should have the benefit of proper bathing and of oral hygiene. The bowels should receive sufficient attention, but active purgation usually is best avoided.

Diet. There is no particular diet that applies and instructions should be based upon the condition of the individual. The food should be easily digestable, free from unfavorable side effects, and of sufficient amount to keep up the proper state of nutrition. Iron containing foods are particularly indicated.

Medication.—Benzol. At the present time, this seems to be the outstanding medical agent in general use. It is not free from the possiblity of harmful effects and, therefore, should be used with a certain amount of caution. The patient should be kept under close observation during its employment. The usual rule is to begin with about 30 minims (2 cc.) total a day and to increase gradually to about 75 minims (5 cc.). It is preferably given mixed with an equal amount of olive oil and put in capsules; these are divided into three or four doses during the day. This should be discontinued upon the appearance of unfavorable results, such as vomiting, diarrhea, headache or dizziness. The blood picture should be carefully watched during the use of this medication and the drug discontinued when there has been a sufficient reduction in the total white count. It is probably best to consider 20,000 as an indication for discontinuance.

Arsenic. Arsenic is the remedy that has been most used in the past. Among the arsenic preparations, Fowler's solution given by mouth is the form of choice. It is best to begin with a comparatively small dose, that is from 3 to 5 minims (0.2 to 0.3 cc.) three times a day, and gradually to increase, until toxic symptoms develop, favorable results are obtained, or its lack of efficiency has been demonstrated. In the face of favorable results a safe maintenance dose may be continued for an almost indefinite time. The patient should be observed carefully for toxic symptoms. Other arsenic preparations such as sodium cacodylate, arsphenamine and iron arsenate have been used by needle.

X-ray and Radium. The x-ray is of undoubted benefit in many cases; this is a treatment fraught with many dangers and should be employed only by an expert. The same applies to the use of radium.

Thorium-x. This has been used for several years and excellent results have been reported. This treatment also is particularly unsafe except in the hands of those particularly qualified to employ it.

Tuberculin, Vaccines and Serums. Tuberculin has its advocates, as have various vaccines and serums. Their value is at least questionable.

Splenectomy. This has been much employed in the past, but the present tendency is rather against it.

Non-interference. It is insisted upon by good observers that it is usually best not to disturb a case by active treatment when the progress seems to be favorable, as trouble may be precipitated.

Symptomatic Treatment.—For the anemia, iron is often used just as it would be for anemia arising from other causes. Hemorrhage is one of the most distressing conditions arising in the course of the disease, and should be combatted just as hemorrhage resulting from other causes. There is nothing peculiar about the management of the gastro-intestinal and nervous symptoms, the usual measures of relief that would be applied for these conditions under other circumstances are employed in this disease.

HODGKIN'S DISEASE

General Statement. Definition.—This is a disease of unknown etiology and fatal termination, characterized particularly by involvement of the lymph glands of the body. Among the other names that have been used in designating this condition are pseudo-leukemia and lymphadenoma. It is probable that the name of Hodgkin's disease meets the requirements as well or better than any other suggested, it is certainly less apt to cause confusion in the mind of the student.

Incidence.—It is much more common among males, and is most apt to appear in early adult life, the large majority of cases occurring between fifteen and forty.

Etiology.—Nothing definite is known but various theories have been advanced.

Course and Prognosis.—The ultimate outcome is always fatal, the average duration of the disease is probably between a year and a half and two years. Many cases live much longer than this, others rapidly run a downward course.

Symptoms and Diagnosis.—The evidences of the disease depend largely upon the mechanical presence of the enlarged glands. The symptoms may be divided into three groups: First the visible glandular enlargement, second the conditions resulting from pressure, third, the secondary anemia due to the disease process and the symptoms resulting from the anemia.

History. This is of importance in eliminating other possible causes of glandular enlargement, such as tuberculosis or acute glandular fever. As suggested under incidence, the age and sex are of importance in suggesting the diagnosis.

Onset. In Hodgkin's disease the onset is usually gradual, most frequently appearing first in the cervical glands, though it may first be noticed in the axillæ, the groins, or elsewhere. While it may be unilateral at first, sooner or later it becomes bilateral.

General Discomfort. Among those symptoms not necessarily due to pressure are fever, itching of the skin, general malaise, and more or less body pains, such as might occur in any febrile process. There may be gastro-intestinal disturbances, such as anorexia and nausea.

Glands. The glandular enlargement usually begins in the region of the neck and gradually extends. The individual glands seldom become very large. They are separate, movable, not matted and the surrounding tissue is not infiltrated. They are not usually appreciably tender to the touch. It must be borne in mind that some of the most distressing symptoms result from the involvement of the deeper situated glands, such as the thoracic and abdominal. These may give rise to such pressure symptoms as dysphagia, dyspnea, pain and cough. The spleen can usually be distinctly palpated.

Laboratory. This sooner or later shows a more or less marked secondary anemia. The white cells are not materially disturbed, although at times there may be a slight increase. There is nothing definite shown by the urinalysis. The main sheet anchor in establishing an absolutely positive diagnosis is the microscopic examination of an excised portion of a gland.

Differential Diagnosis.—The conditions most apt to be confused with this are lymphatic leukemia, tuberculosis, malignant tumor and acute glandular fever.

Leukemia sooner or later gives the characteristic blood picture, showing the large increase in the white cells with a marked preponderance of certain groups. The examination of an excised gland will positively differentiate. Leukemia, of course, has a much more marked tendency to splenic enlargement.

Tuberculosis may be differentiated often by the history, and by the presence of tuberculosis elsewhere. There is sometimes in tuberculosis a general glandular involvement, but there is a marked tendency to matting and breaking down of the glandular structures. The microscopic examination of the excised gland will give positive evidence.

Lymphosarcoma and carcinoma can be absolutely differentiated by an examination of the excised tissue. There is not the tendency to bilateral and general glandular involvement. There is a marked tendency to infiltration of the surrounding tissues. A primary involvement elsewhere may often be found.

Acute glandular fever is easily differentiated by the sudden onset and the rapid subsidence of the process, as well as by the lack of the characteristic evidences of the disease under discussion.

Prophylaxis.—As the etiology is unknown, there is nothing to be suggested in the way of prevention.

Treatment.—It should be remembered from the first that the condition is absolutely fatal; effort is, therefore, directed at prolonging life and contributing to comfort. The physician often will have to use much judgment in making known to the patient or responsible parties the status of the case, so that the affairs of the victim can be put in order, should this be necessary.

General Care.—The amount of rest that is necessary will depend upon the condition of the patient. There is nothing to be gained by arbitrary confinement if the individual is able to be up and about. Such details as fresh air, sunshine, proper warmth, proper clothing, and the various factors that go to make life comfortable and contribute to a state of well-being should receive minute attention. Because the case is hopeless, is no reason why the patient should not have the benefit of every possible comfort while able to appreciate them. Particular attention should be given to general hygiene especially intestinal elimination.

Diet. Effort should be made to maintain as high a state of nutrition as possible; the time may come all too soon when the intake of food will be arbitrarily limited. There is no special diet and these patients may be allowed any good food that experience and observation show to be within their digestive ability.

General Treatment.—Many measures have been suggested for prolonging life and contributing to comfort. Among these may be mentioned the following:

Arsenic. This is used in its various forms, the most common being Fowler's solution. This is given in increasing doses, the amount depending upon the effect. The usual course is to begin with about three minims (0.2 cc.) three times a day and gradually increase until mild toxic symptoms develop, or the inefficiency of the drug has been demonstrated. Should it give relief, a comfortable maintenance dose is sought and may be continued indefinitely. Many prefer to prescribe periods of rest during the course of this medication. The patient should at all times be carefully watched for unfavorable symptoms, such as edema, gastro-intestinal disturbances, renal irritation or cutaneous lesions.

Benzol. This is used very much as in the treatment of leukemia (See page 576). The usual dose is about 7½ minims (0.5 cc.) three times a day. It is given in capsules mixed with an equal amount of olive oil, and this amount may be gradually increased up to a total of 60 or 75 minims (4 or 5 cc.) a day. Its use should not be persisted in should unfavorable symptoms develop or failure to benefit be demonstrated.

Arsphenamine. This is usually employed in the form of neoarsphenamine, is given intravenously, and good results have been claimed by many competent observers.

X-ray and Radium. These have been used with excellent results in many cases.

Surgery. The general concensus of opinion is against the use of surgery, except as a measure of relief from some special pressure symptom, as pain.

Symptomatic Treatment.—It is at times necessary or advisable to give the patient the benefit of symptomatic relief. The secondary anemia will often indicate the use of arsenic. This is used just as in secondary anemia from any other cause (See page 559).

Nervous symptoms, particularly insomnia, may call for bromides or barbital; opiates may at times be indicated.

There is every reason why these patients should be given the benefit of sufficient medication to relieve pain should this symptom develop. Codeine may be used and there should be no hesitation in employing morphine should it seem necessary.

SPLENIC ANEMIA (INCLUDING BANTI'S DISEASE)

General Statement. Definition.—The term splenic anemia is used to designate what is a more or less poorly defined group of conditions that have in common the following characteristics: splenic enlargement, hepatic cirrhosis and a chlorotic type of anemia. There are many other symptoms that are usually common to this group. The present tendency is to consider what was once regarded as several diseases as different stages of the same process. The first stage is characterized by an idiopathic enlargement of the spleen, the second by splenomegaly and anemia, the third or end stage by the condition known as Banti's disease. The infantile type, Gaucher's disease and some other related conditions are not included in this discussion.

Incidence.—This condition is more frequent among males, and most often found in the third and fourth decades of life. It is probably more common before twenty than it is after forty.

Etiology.—Nothing definite is known, though many theories have been advanced, among which is that of a specific organism. It has been fairly well established that such conditions as syphilis, tuberculosis and malaria that were once thought to be etiological factors, do not play a part.

Course and Prognosis.—There is a marked tendency to remissions and exacerbations in the progress of the disease, but the general course is absolutely downward to a fatal termination except in those cases where relief is obtained through surgical measures. The duration is anywhere from three to twelve years in non-operated cases.

Symptoms and Diagnosis.—The symptoms vary materially during the course of the disease as many of them result from the damage that sooner or later is done, such as hepatic cirrhosis and the progressive anemia. It is possible, therefore, to have any of an almost infinite variety of manifestations.

History. The history is of importance both in eliminating other possible causes for the splenic enlargement, and in establishing a direct diagnosis. There is usually the statement of a slow onset, the condition often being discovered in the course of a routine examination when the patient had not had sufficient symptoms to cause him to seek medical advice. It is probable that most cases have run for years before the diagnosis is made.

Subjective Symptoms. As previously suggested these depend very largely upon the state of the disease and the damage that has been wrought. There is sooner or later pain in the region of the spleen and upper abdomen generally. As the blood and liver changes become more definite, there are the natural consequences of this impairment, such as weakness, vertigo, anorexia, gastric and intestinal discomfort, headache, shortness of breath and palpitation.

Splenomegalia. This is a constant finding, though the degree of enlargement is quite varied.

The Liver. The liver undergoes the characteristic changes of cirrhosis; there is a tendency to jaundice; that may be quite pronounced.

Edema. There is edema, particularly of the lower extremities and later, ascites.

Skin. There is often enlargement of the superficial veins, particularly late in the disease, and there may be pigmented areas, probably resulting from the hemorrhagic tendency.

Anemia. Anemia is often evident fairly early in the disease, and later is marked. Not only is this evident upon examination, but it gives rise to the various characteristic symptoms.

Fever. There is a tendency to elevated temperature particularly late in the disease, though it is not usual for this to be very marked.

Laboratory. An examination of the blood reveals anemia usually of the chlorotic type. There is a reduction in the total red cells but a much greater reduction in the hemoglobin. The white cells may be materially altered; the usual tendency is to a reduction in the total count, but there may be at times a slight increase.

The urine late in the disease is apt to show albumin, casts and bile pigment.

Differential Diagnosis.—Splenic anemia can be readily differentiated from the leukemias by the lack of involvement of the lymph glands and by the blood picture. Pernicious anemia shows many other differences such as a high color index in contra-distinction to the low color index of the disease under discussion. Hodgkin's disease can be differentiated by the involvement of the lymph glands as well as by other less well defined differences. Malaria is at times extremely hard to differentiate. I have known a whole group of highly trained clinicians to agree on a diagnosis of Banti's disease when malaria was the condition present. In most cases a careful search of the blood will show the plasmodia. There is usually a decided difference in temperature. The history of the case will often give information, but at times a careful evaluation of all the available clinical data is necessary to establish a diagnosis. Should there remain any doubt, a therapeutic test (quinine in full doses) should be tried.

Prophylaxis.—As the etiology is entirely unknown there are no prophylactic measures that can be suggested.

Treatment.—Treatment may be divided into surgical and non-surgical. In a non-surgical way many measures have been tried and these unquestionably may prolong life and contribute to comfort, but there is no hope of their establishing a cure.

Arsenic. Arsenic dioxide or Fowler's solution by mouth or the various preparations by needle are used. Among the latter, arsphenamine is frequently employed.

X-ray and Radium have both been extensively used.

Thorium-x has been frequently advocated.

Benzol has been extensively used just as suggested for leukemia (see page 576).

General Care. Under all circumstances rest, fresh air, sunshine and a good wholesome diet are indicated. Iron and arsenic for the anemia certainly seem to be indicated, just as recommended in the treatment of secondary anemia (see page 559).

Surgery. This is the only measure that offers any hope of cure at the present time. The removal of the spleen if it is done early before irreparable damage to other structures has taken place, offers a fairly good chance of cure. The immediate mortality of the operation is a little above 10 per cent. It is urged that once a diagnosis is definitely made, the sooner splenectomy is done the greater the chances for satisfactory results.

DISORDERS OF THE NERVOUS SYSTEM

FUNCTIONAL NERVOUS DISORDERS

General Statement.—It is not the intention here to give a complete scientific discussion of this group. A student of this type of disease would, naturally, look to the numerous and more comprehensive treatises that have come from the pens of experts. It does seem necessary, however, in a work on medical diagnosis and treatment to give some space to conditions of as much importance as are the functional nervous disorders. They are of particular interest from two standpoints. First, from that of the condition, per se; and second, because various deviations from the normal, of the type under discussion, may often complicate the picture in cases of true organic disease. Someone has said that he preferred to treat children rather than adults, for the reason that the children at least would not deceive him by presenting a multiplicity of symptoms that had no pathological foundation.

It is generally recognized that no one is perfect physically. We find gross deformities such as club-foot and cleft-palate, and everyone presents at least mild deviations from the normal, such as imperfectly shaped limbs, defective teeth, and bald scalp. We are prone however to fail to recognize that people probably present as wide a range of mental or nervous deviations as they do of physical. Because these are not so plainly visible, the tendency is to overlook the possibility of their existence. We are all familiar with the old saying, "Everyone is queer save thee and me—and sometimes I think thee is a little queer."

It is extremely difficult at times to say just when these deviations from perfection reach that point where the condition justifies the distinction of a definite name, as hysteria and neurasthenia.

No one is in a perfect physical state and it is at times almost impossible properly to evaluate the statements of a patient, and to decide which symptoms are based entirely on pathological conditions, which are partially pathological, and which have no pathological foundation whatever. We must recognize the fact that not only may deviations from the physically normal, however slight, give rise to a train of symptoms that may be exaggerated by the patient, but also that the patient who is nervously or intellectually sub-normal is probably more prone to the development of actual disease than is the well-balanced individual.

More than one type of nervous disorder may be present in the same individual; for example, the patient with hysteria may develop neurasthenia. Probably the most common deviation from the normal that is encountered is of a mild type, sometimes classed as the simple subnormal, that often does not fit under any of the major heads usually employed in classification. These cases, whose name is legion, present one of the greatest problems in medicine.

In the more serious cases, it is sometimes extremely difficult to say when the neurasthenia or hysteria ends and a more serious mental disorder begins.

Another factor that must be considered in treating any of these various types is the matter of malingering. Here the symptoms have no foundation in fact, but are brought forward by the patient to obtain sympathy or more than his share of comfort or for many and various other reasons.

No effort will be made here to cover all types of nervous disorders, in fact the classification is still not definitely established and much yet remains to be done in the way of uniformity in teaching and writing. I will discuss only those conditions that can be classed under the heads of neurasthenia and hysteria, including some of those cases that hardly seem to fit under any of the common classifications, and yet constitute a group that must be recognized in the practice of general medicine.

NEURASTHENIA

General Statement. Definition.—Neurasthenia is a functional disorder the result of nervous fatigue, due to one or more external causes. The terms nervous exhaustion and nervous breakdown are often used, especially in describing the more advanced types. The majority of cases as seen in general medicine present only mild phenomena. The condition even in the minds of the medical profession is often associated with hysteria or other types of deviation from the normal, and at times a correct differentiation is difficult, if not impossible. The present understanding, however, is that this condition is not the result of a constitutional defect, as is hysteria, but is an expression of the effect of the wear and tear under unfavorable conditions in a more or less normal individual.

Incidence.—While almost any class or type of person may be affected, neurasthenia is more common in brain workers, particularly in those groups that have large responsibilities. It differs in this respect from hysteria. The disease is not unusual among students, (and even the teaching staff) towards the close of a session, in schools having exacting requirements. We find it among brokers towards the last of a strenuous season and among business men, particularly in periods of financial stress. A typical example may illustrate: Mr. F., an apparently prosperous druggist, developed a mild neurasthenia that was resistant to treatment. One morning he made the announcement that he had been forced into bankruptcy, and it was learned that, while maintaining a cheerful and prosperous front, he had been struggling against adversity for something like two years. During that time he hardly knew in the beginning of any week whether its close would find him in possession of the business. The principal cause of anxiety to him was that the money of many of his friends had been invested in his venture. He was able to adjust his affairs on a fairly satisfactory basis, secured a good position, and, without other treatment all of his symptoms disappeared.

Etiology.—The importance of heredity is still a matter of dispute. It is probable that it plays a part here, as it does in most other phases of life. Considerable difference of opinion also prevails as to the effect of disease in the etiology. It seems only reasonable to suppose that a factor such as impairment of health with its attendant discomforts would result in undermining the nervous stamina of the individual. It must be borne in mind that in many instances the victim of impaired health must work and continue to struggle along trying to carry the same burdens that he had when conditions were normal. It is only reasonable to believe that any physical handicap may be an important etiological factor. A particularly favorable condition for the development of neurasthenia is sustained mental strain or exertion. The effect of physical effort is more uncertain, but it is very questionable if it alone ever causes this trouble. The vocations that require long hours and the living conditions that admit of limited sleep, rest, or recreation, are all of importance. Excessive use of coffee, tobacco or alcohol have their place in the etiology. In fact it might be stated in a general way that any deviation from a normal balance between work, rest, sleep, and recreation may be a factor in developing a nervous imbalance.

Course and Prognosis.—Where favorable living conditions can be obtained, the causative defects in living can be remedied, and there is no disease that prevents the return to physical normality, the prognosis is excellent. In other words, the outcome will depend very largely upon the extent to which the condition has developed, and the opportunity for treatment and adjustment of life along proper lines.

Symptoms and Diagnosis.—In arriving at a diagnosis of neurasthenia, there are many factors that must be considered, and it is probable that the tendency is not to investigate sufficiently these cases from a medical point of view. The investigation must include the following:

First. The organic and functional condition of the patient to discover what is present.

Second. The elimination of other diseases, or in other words, the determination of what is not present.

Third. Sufficient thoroughness to gain the confidence of the patient so as to secure better cooperation in the procedures to be prescribed, as these often entail the greatest possible inconvenience to the individual.

It has been said frequently that it requires more skill and judgment to have the treatment carried out than it does to order it. The neurologist usually sees the severer cases or the chronic ones that have proven resistant to treatment at the hands of the general practitioner, and it is usually these that are discussed in medical literature. As a matter of fact, the overwhelming majority are of the milder type, and often there are only neurasthenic tendencies complicating actual pathological conditions. It must be remembered that the neurasthenic patient may develop organic disease and that the organically sick patient may develop neurasthenia as additions to his primary troubles. It should also be remembered that very often the neurasthenic tendency manifests itself as an exaggeration of the symptoms of some organic disease really present. It is sometimes extremely difficult to ascertain to what extent the patient is otherwise sick, and to what extent he is only neurasthenic. It is probably for these reasons that many patients go from doctor to doctor and have such diverse diagnoses given them.

History. A careful history is essential. It should include an inquiry into a family tendency to a lack of nervous stamina, and a thorough investigation as to all those conditions that are known to be of importance in bringing about functional disorders. Of particular interest is the history of a previous disability of a similar nature.

Symptoms.—The symptoms are usually divided into the sensory, the motor, the somatic, and the psychic. No effort will be made here to give a detailed or thoroughly scientific discussion of these phenomena, but only to suggest the principal points in a general way. As Dercum so aptly states, most of these symptoms are essentially those of fatigue.

Sensory Symptoms. Among these are a sense of lessened efficiency. There is a tendency to a general discomfort, such as backache and pains in the limbs. Headache is usually present, either as a more or less constant pain or there may be merely a dull discomfort. The headache is most commonly described as being in the back of the head and extending down the neck. The consistency with which the back of the neck is involved is rather striking. There is often dizziness, and at times this is one of the most constant symptoms. The patient may complain of the fear of fainting or falling. There may be areas of tenderness very much as in hysteria, although this is rather unusual. There is often a sensation of tingling or of heat or cold, in certain portions of the body or they may be general. There may be impairment of vision, hearing, smell, or taste.

Motor Symptoms. The most common is weakness and disinclination or inability to maintain physical effort. There may be twitching, most commonly to the eyelids. Sometimes patients complain that this uncontrollable twitching is embarrassing, because they fear that someone will think they are winking at them. There may be tremors, but never the apparent paralysis and contractions that are seen in hysteria.

Somatic Symptoms. One of the most troublesome is indigestion, particularly the eructation of gas. This is often the result of aerophagia, but it should be borne in mind that these patients are suffering from nerve fatigue which naturally tends to functional impairment of the muscles of the digestive tract, interference with gland function, and relaxation of the abdominal muscles with possible visceroptosis.

There may be interference with the urinary function, which usually takes the form of frequent micturition. Excessive sweating may be present, general or local. Coldness of the hands and feet is sometimes felt. Sexual disturbances are markedly common, and the change here is, of course, a reduction from the normal, as would be expected in a fatigue condition.

Psychic Symptoms. These are among the most permanent and important evidences of this condition. The outstanding feature is the reduction of normal efficiency, particularly a disinclination to mental effort. The most classical instance of this kind that I have met was that of a distinguished author who spent several years in completing an extensive literary effort, and for several years following was unable to write even a short article requiring any concentration or original thought. One of the most common complaints is "I feel that I am losing my mind." There is a marked tendency to irritability, even the most trivial occurrence giving rise to unexplainable annoyance. There is usually insomnia and it is probable that this condition especially tends to establish a "vicious circle." The loss of sleep accentuates the nervous imbalance, and the nervous condition contributes to the inability to sleep. These patients complain particularly of the lack of a sense of well-being in the morning, stating that they do not get sufficient benefit from what little sleep they succeed in obtaining. There is a tendency to states of fear which may assume some particular form, such as a disinclination to sleep alone or to sleep without a light burning in the room. I remember particularly a dental student who succeeded in taking off all the honors in his class by sacrificing everything to the effort who was unable to work for a year or two afterwards, during which time he insisted that he could not sleep in a room by himself, though he was a physical giant and a man who had never known before what fear meant.

Differential Diagnosis.—In the advanced or more serious cases this is usually comparatively easy, particularly if a sufficiently careful and complete history can be obtained. In the milder type of case no difficulty may be encountered if disease as a cause of the symptoms can be excluded, and the history of a probable cause for neurasthenia obtained. A correct diagnosis can usually be made by the proper evaluation of all the available data. In many cases more will depend upon the elimination of other possible causes for the signs and symptoms present.

Prophylaxis.—This depends upon avoiding excessive mental strain and maintaining the proper balance between work, rest, and recreation. These matters are discussed in detail under etiology and treatment. For susceptible individuals particularly, my rule has been—Take a regular vacation occasionally, but take some vacation every day.

Treatment. General Care.—In carrying out any plan of treatment, it must be borne in mind that primarily neurasthenia is an expression of fatigue and, therefore, that reparation can only be effected through rest. The principal question is, to what extent should this measure be enforced. This will depend upon the condition of the patient, the duration of the disease, the failure of previous efforts, and the ability of the individual to cooperate in treatment. In some cases nothing but absolute rest in bed will give results; often the individual is so disqualified for effective work that no material hardship is imposed in enforcing this.

Complete Rest. This type of treatment is best taken away from home. There are several advantages: The patient is under more complete control, and removal from the environment in which the disease developed is naturally desirable. There seems to be an actual benefit simply in a complete change of surroundings. Where the proper type of sanitarium is available, it is ideal for the purpose; otherwise a hotel may be used. Sometimes a private home, such as that of some relative, will meet every requirement. Treatment quarters should be selected with the greatest possible care. The room should be isolated as far as possible, it should be properly ventilated, heated, and lighted, and near the bathroom. A screened porch adjoining the bedroom is of decided advantage, particularly in pleasant weather. The furnishings of the room should be simple, free from bric-a-brac or objectionable pictures, but cheerful. Flowers and potted plants may be used freely if they are pleasing to the patient. The floor should be properly covered and the nurse should wear rubber heeled shoes. The patient should be in the care of efficient nurses as attention here requires infinite tact, patience, and cheerfulness. It is needless to say that the family and friends should be partially or entirely excluded, and all business or domestic cares absolutely banished. During the period of rest daily baths should be given, and hydrotherapy may often be employed to advantage, such for example, as the evening bath to induce sleep. Massage is of marked benefit in practically all cases. This should be carried out lightly at first and increased as indicated. The diet will be discussed in a later paragraph.

Partial Rest. In all cases at least partial rest is essential, and this meets the requirements in the vast majority of instances. A case of absolute rest treatment becomes a partial rest case as improvement takes place. It is usually necessary to prevent indefinitely the return to those conditions that brought about the disorder in the first instance. In the plan of partial rest, business and domestic responsibilities must be avoided as much as is practicable. Long hours of sleep are given and lying down after each meal is of distinct advantage. The duration of this stage will depend upon the apparent requirements, and may be regulated by the response of the patient to this plan of handling. An important element is the measure of diversion. Individualization is necessary as some form of recreation must be selected that is pleasing to the individual. Very often the abnormal condition is not the result so much of general over effort as it is over effort along some particular line. Let me illustrate: A medical student in his sophomore year began to develop neurasthenia; he could not sleep well, could not study, and was failing in his examinations. He was spending every hour that he could stay awake at "book nursing" and entirely neglecting all exercise and recreation. I did not think that he was in a position to lend himself to a full rest treatment or that it was indicated. I began by planning for him proper diet, periods of rest, sufficient time for meals, systematic diversion, such as attending ball games, concerts and track meets, and asked him for two hours a day in addition. He complained, that by using all of his time he was unable to meet his class requirements, but finally consented to allow me to order his manner of living. I used the two hours a day in requiring him to spend one hour in the gymnasium and one hour in the parks. His symptoms disappeared, his weight rose to normal and he spent the remaining three years not only without a return of the neurasthenia, but graduated with distinction, a normal and well balanced man. In all of these cases alcohol, tobacco, and excessive use of caffeine-containing beverages should be prohibited. Thorough elimination must be maintained. Considerable amounts of water should be taken. In many of the milder cases a carefully regulated vacation will do much to restore a normal condition. These trips should preferably be taken to some pleasant climate of such a type as to afford not only rest, but mental change and relaxation. I have sent patients for a long cruise on the Great Lakes, having them stop, as they felt inclined, at the various places of interest.

Diet.—The amount of food necessary will depend largely upon the nutritional state of the patient. The effort should always be made to bring the weight to normal, as the physical results are desirable and the psychic effect is good, and, while the worth of suggestion here is not to be compared to the case of hysteria, at the same time we must not under-rate the value of the stimulation that results from a proper frame of mind. The diet should be such as to make the minimum demand upon the digestive ability. Milk is undoubtedly the most valuable food; it usually can be taken in any reasonable amount and may be used in addition to the usual meals. Even where there is little inclination for food, the patients may arbitrarily force themselves to take milk. It may be given plain or as cream soup, cream with cereal or fruit, milk shakes, milk chocolate, cocoa, buttermilk, or cream cheese. In many cases the patient may be encouraged to take three meals a day of properly selected food, and a milk shake about two hours after each meal. The following formula may be used:

1 whole fresh egg
1 heaping tablespoonful of malted milk
Flavor (as a tablespoonful of chocolate syrup)
Ice
Milk to fill shaker.

Properly made, this has a value of nearly 400 calories. One of these after each meal will add to the food intake from 1000 to 1200 calories. Articles of diet may be added to meet special requirements, as laxative foods to counteract constipation. It is usually best to avoid spices, pickles, and other articles that may be in themselves harmful or that may take the place of more nourishing food.

Exercise.—In the severe case exercise at first is not to be considered. In the majority of instances, however, modified exercise may be instituted from the first. One of the principal considerations is to restore normal muscle tone. The activity should, therefore, never be to the point of tiring, but only sufficient to produce relaxation. Exercise not only contributes to a sense of well-being, but improves such functional conditions, as digestion and elimination. It should be borne in mind that the amount of exercise must depend upon the condition of the patient and his response to this form of treatment. Tension exercises must be avoided. Light free hand movements are the most valuable in the beginning. This should begin in a small way and be increased gradually. It should be directed so as to bring into play all of the groups of muscles as far as possible, without overtaxing any of them. Most people are familiar with the free hand exercise as it is taught in the schools and the intelligent physician may either prescribe and train the patient in the necessary movements or have this done by some competent instructor. Some patients may be sent to a gymnasium with benefit as the convalescence progresses. Walking is excellent and is available to all cases except those who need the full rest treatment. Usually in the beginning, and in all cases sooner or later, some pleasant form of recreation should be prescribed such as horseback riding, swimming, golf, or tennis. Special exercises may be ordered at times to meet particular requirements, as the abdominal exercises for indigestion and constipation. If possible, exercise should be followed by a warm bath, then a cold spray or shower, and a brisk rub down.

Symptomatic Treatment.—This is seldom a matter of particular importance. Laxatives may be needed, though the regulation of diet and exercise will usually meet the requirements. Simple tonics may, at times, be of value for impaired appetite, though it is probable that their usefulness is principally psychic. If there are any definite digestive disturbances, such as hypochlorhydria, they may be treated in the usual way.

Insomnia may at times require medication, such as the use of bromides, luminal or barbital, but it must be remembered that these usually add to the discomfort that already exists, and their use should be confined to meeting temporary requirements.

After-care. The principal consideration here is to prevent the return to those conditions that are responsible for the development of the disorder. The future life of the patient should be so arranged as to maintain a desirable state of nutrition by diet and elimination. He should take sufficient exercise to maintain a proper state of well-being, and avoid over-effort at all times. He should have daily periods of relaxation, regular vacations, and at all times have sufficient recreation and mental diversion. This is often accomplished by the development of some hobby that carries him out of doors and away from his usual vocation, such for example as amateur photography, golf, hunting, fishing, or boating.

HYSTERIA

Definition.—This is a functional nervous disorder characterized by various phenomena, the result of suggestion being grafted on a congenitally defective mental status, that has rendered the individual particularly susceptible. It is fairly well recognized now that true hysteria is primarily a congenital condition and that while it may only be brought to light later in life, the conditions for its development were always present. The term itself is derived from the original Greek word meaning the "womb," as it was supposed that these cases were the result of uterine disturbances. For many years it has been recognized that this hypothesis is incorrect, as is particularly shown by the fact that both men and women are susceptible.

Incidence.—All ages, kinds and conditions of people may be affected, but it is most apt to be evidenced in late childhood or early adult life. It is probable also that the condition is found more in the lower strata of society, although many typical examples develop among all classes. It will be found by careful tabulation that a group of patients from the laboring classes gives considerably more cases of this disease than the same number of patients among the intellectual. Incidentally it is noteworthy that the reverse is usually true of neurasthenia. A possible explanation of this is that in the process of "the survival of the fittest," the families that have risen to the surface usually have been those who had the purest intellectual heritage.

Etiology.—As previously stated, the primary factors for the development of this condition are congenital; the actual onset of the hysteria may be the result of some intensive suggestion. It is also true that organic disease that exhausts the patient's physical and nervous resources favors the development of a condition of this character.

Course and Prognosis.—A prognosis as to the recovery from a particular attack is almost uniformly favorable, but it must not be forgotten that the primary etiological factors remain and, therefore, once a hysteria patient, always a potential case of hysteria. The principal factor influencing the prognosis is, naturally, the facilities for treatment including the possibility of controlling environment.

Symptoms and Diagnosis.—A most thorough investigation should be made and recorded. This should include a careful history, a physical examination and adequate use of the laboratory. This will be discussed further under treatment.

History. It is highly suggestive to find that other members of the family have shown nervous instability, particularly such conditions as hysteria, neurasthenia, epilepsy, insanity, or even migraine. The history of previous acute attacks is, naturally, of importance. A careful investigation to discover whether there be present or recent disease or psychic trauma is absolutely essential.

Symptoms.—It is customary to divide the symptoms into sensory, motor, somatic, and psychic. In a consideration of all of these, it should be remembered that the diagnosis fundamentally rests upon the fact that the symptoms as given do not tally with those that would result from any known pathological condition, and particularly that they do not harmonize with the evidences as found upon careful examination.

Sensory Symptoms. There may be areas of anesthesia, hypesthesia, or hyperesthesia, but these do not bear consistent relation to definite nerve distribution and are not of the type that would be the result of known disease. There is a tendency for these to change from place to place. One of the very frequent areas of predilection in women is the lower left abdominal quadrant, particularly the region of the left ovary, though any part of the body may be affected. These areas have a marked tendency to be entirely superficial. Another very characteristic symptom is the sensation of a lump or ball in the throat (globus hystericus), which is not usually complained of as painful, but rather as uncomfortable, the patient's having the feeling that if the lump could be swallowed relief would be obtained. Headache is a fairly constant manifestation, and is often referred to the back of the head and described as extending down the neck.

Motor Symptoms. These may include such as paralysis, contractions, tremors and incoordination. Very often the area particularly affected by motor phenomena is also the site of sensory symptoms. As in the case of the group previously discussed, these do not harmonize with the evidences of organic disease.

Somatic Symptoms. Among these are anorexia, dyspepsia, vomiting, diarrhea, rapid breathing, cough, retention of urine, polyuria, and vasomotor phenomena. There may be visual disturbances, such as impairment of the color sense or there may be a disturbance of the senses of smell, taste, or hearing. As in the case of the preceding groups these do not run true to form and are incommensurate with the evidences of organic disease.

Psychic Symptoms. The patient may present such symptoms as irritability, restlessness, insomnia, periods of profound mental disturbance, periods of a tendency to laughing or crying, or even such states as convulsions or unconsciousness.

Differential Diagnosis.—If the investigator will bear in mind the symptoms resulting from organic diseases and compare these with the symptoms presented by the patient, the diagnosis is usually comparatively easy. A few cases may illustrate probably better than a detailed description.

Mrs. A. presented practically all of the symptoms of angina pectoris and the history in her case was that she had had partial care of a relative who suffered and died from that disease. The main deviation in her picture was that she had selected the wrong side and the discomfort was all in the right chest.

Mrs. B. is subject to violent convulsions resembling very closely those of uremia, with the exception that during these attacks she jumps out of bed and makes apparent efforts to do herself bodily injury as, for instance, by jumping out of the window. It need hardly be mentioned that in convulsions which are the result of organic disease the patient does not have such excellent use of her motor apparatus.

In differentiating particularly the convulsions of hysteria from those resulting from pathological conditions, it may be mentioned that in the former these patients do not bite the tongue; do not fall and injure themselves, even the oldest cases showing no scars; do not have those convulsions when alone; do not entirely lose consciousness, although they may simulate such a state; do not lose sphincter control.

Prophylaxis.—This probably depends more upon establishing and maintaining the highest possible state of general physical and mental health. A particularly important factor is wholesome agreeable occupation. The primary consideration naturally goes back to eugenics.

Treatment.—All students of this condition emphasize the importance in the careful handling of the patient particularly to avoid the suggestion of any symptoms that do not already exist. For example, if the patient is aware of the fact that the doctor is searching for any particular symptom that symptom is very apt to develop; in fact, it is claimed by some of the late writers, that the large majority of all of the symptoms are those that have been suggested, in most cases by the medical attendants. On the other hand it is very necessary that the patient be given a sufficiently thorough examination to meet three requirements.

First, to ascertain the organic and functional status of the individual.

Second, to eliminate conditions that might be responsible for the symptoms given, or a factor interfering with the well-being of the patient. For example, it would be very unfortunate to account for all symptoms present on the basis of hysteria, and to find later that the patient had, in addition, syphilis or tuberculosis.

Third, to gain the confidence of the patient. This is one of the most important elements in the management of the case. The patient is less likely to be dissatisfied with the statement of the physician as to the presence or absence of certain conditions if his reason convinces him that a sufficiently careful investigation has been made. We should feel rather a degree of disappointment in these cases if the patient does not give a voluntary expression of this satisfaction, with words such as: "I feel that if there is any trouble, you have certainly found it." Or, "You are certainly thorough." Or, "I appreciate the interest you seem to be taking in my case."

The management of these cases may be divided into General Care, Symptomatic Treatment, and Suggestion. The matter of suggestion, in fact, must permeate every phase of the treatment from beginning to end.

General Care. Rest. In deciding upon the extent to which rest is best employed there must be taken into consideration many factors: such, for example, as the physical condition of the patient; the financial status; the field of usefulness, or the necessity for continued activity, such, for example, as in the case of the mother of a household or the breadwinner of the family. In some cases the condition of the individual is such that a considerable period of absolute rest in bed is necessary. In others a short period of absolute or modified rest will be found a distinct advantage in the beginning of the treatment. In the majority of cases, as they are met in general practice, the best results are probably obtained by promptly getting the patient into a wholesome, normal manner of living by the employment of the various plans looking towards the attaining of the highest possible state of physical development and at the same time giving infinite attention to all of the many details that tend toward establishing mental balance and nervous stability. When the rest cure is employed, it is much better to have the patient away from home, as the main idea here is to get the individual out of the mental rut and environment which has been the cause, in many cases, of the development of the condition present. This particularly includes the isolation from the indulgence and sympathy of the immediate family and friends. In many places hospitals, or sanitaria offer ideal conditions for the management of these cases; in other places, facilities have to be improvised. For example, I have known several highly successful internists and neurologists to take their cases to some hotel, preferably selecting a more or less isolated room on the top floor and putting the patient into the hands of competent nurses. I once knew a retired nurse who had a home arranged for the accommodation of two or three such cases, where she and her sister gave them excellent attention. The home was quite isolated and the results were excellent. Where it is necessary to treat a case in the home, it is best to select an isolated room, put competent nurses in charge, and entirely to exclude the family and friends for the duration of the intensive treatment, or at most allow them a few visiting hours a week. During this same period it is best to keep the patient absolutely in bed, allowing her only to go to a conveniently located toilet and, even this, at times, may be inadvisable. It is needless to say that the patient should be made as comfortable as possible. This would include a comfortable bed and a room properly heated, ventilated and lighted, excluded from noises, unpleasant odors and everything else that might interfere with comfort. The room should be made cheerful, particularly in the exclusion of such a thing as unpleasant pictures and untidiness. If the patient is fond of flowers, they should certainly be allowed and encouraged. Meal service should be the best possible, including good food and attractive service. It is often of advantage even to give attention to such details as phonograph records listing the ones that may be allowed and instructing that these be played with a soft-tone needle. The selections should include only those that are of a soft and pleasing nature, such as Shubert's Serenade, Ave Maria, and On the Wings of Song. The reading matter should be carefully supervised, and anything of an unwholesome nature absolutely excluded. In one case where I had given a reading list including some of Mark Twain's works, on a subsequent visit to the patient I noticed a suspicious bulge under the covering which upon investigation proved to be a set of Boccaccio's Decameron! The patient, by the way, had a background of the type that might be suggested by this literature.

Of the utmost importance is the nursing. A physician of long experience can usually look over his list of nurses and select those that are best qualified for a case of this type. They must have sufficient ability to command respect and confidence, and sufficient firmness to carry out instructions, and yet be of the type that will inspire the proper frame of mind in the patient. Endless patience, tact, and judgment are, of course, essential. A large part of the suggestion that is used in the treatment of these cases can best come directly from the nurse, under the supervision of the physician.

The matter of when to terminate the period of rest will, of course, depend upon the progress of the individual case, and no set rule can be applied. When the patient is under-weight this matter should receive prompt attention, as the feeling of well-being and the marked psychic effect that comes from a gain in weight are important factors. They feel that they are making headway, that the doctor is getting results and, therefore, has control of the situation. There is practically nothing that does more to inspire confidence and create a mental attitude favorable to the reception of suggestion. The details will be discussed under the head of diet.

During the period of rest, masssage may be of marked benefit. When the patient presents areas of tenderness, these, of course, will have to be considered; they may or may not be given local treatment, depending upon conditions.

The usual daily cleansing bath should be employed, and very often hydrotherapy will be found of advantage.

Electricity has been recommended by many, and may give satisfactory results.

Following the period of rest the patient is gradually brought into the next stage of treatment by being allowed to sit up for brief periods, very much as in the rest treatment for tuberculosis, though of course the return to activity may be more rapid. Careful supervision and individualization is here necessary.

Regulated Activity. While the rest treatment is necessary in some cases, it is probable that the majority of patients who present themselves to the general practitioner are given the best results by the immediate regulation of their lives along the lines of correct living. This includes proper rest, exercise, recreation, employment, and diet. Most of these cases present very material deviations from the ideal in their manner of living; the corrections necessary will depend, of course, upon the conditions found, and no set of rules can be laid down to meet the requirements of all cases. One of the first considerations is to bring the patient to a proper state of nutrition, which may include the putting on of weight or in some instances reduction. This matter is discussed in detail under the head of Underweight, page 549.

Where there are no contra-indications, the following may be used as a working basis.

Exercise. Among the best are the "setting up" exercises, to be employed night and morning. It may be necessary to begin in a small way and gradually to increase. The "tension" exercises are not advisable here. When the patient is ready, for them, such additions may be made as walking (this should be for a definite distance), golf, tennis, hunting, fishing, or any activity that combines physical effort, mental relaxation, and pleasure. Later special exercises may be added to correct certain troubles, as abdominal exercises for constipation. All of these not only have a directly beneficial effect, but tend to encourage patients when they see that they are obtaining results.

Diet. The amount of food should depend upon the requirements as indicated by the state of nutrition of the patient, the digestive ability, and the results desired. Under all circumstances it should be a diet that will not produce any unpleasant effects. It may be modified to meet special requirements, as laxative foods for the one who is constipated. It is usually advisable to use a written list and make the patient adhere to it rigidly. When it is desirable to increase weight, milk is the most important item, the amount being regulated to meet the requirements as shown by a weekly weight record. Usually about three pints of milk and a half pint of cream, in addition to other food, will be satisfactory, and this may be given as such or in the form of milk-shakes, milk-chocolate, cocoa, milk soups, etc. This will be discussed further under the head of symptomatic treatment.

Occupation. Some mental occupation and often physical work is a necessity in most cases. The particular occupation will, of course, depend upon the condition and equipment of the individual. The ideal is that type of work which is congenial, arouses interest and requires both mental and physical effort. The following illustration may serve to emphasize the foregoing suggestions.

Mrs. A. came to my office presenting many and varied symptoms, but in spite of the long written list (27 items), nothing except mild functional disturbances, such as constipation, were found. Upon investigating it was learned that she had come to the city about two years before. In her former home she had been pleasantly occupied with her domestic affairs, had been an active worker in the church and a leader in social activities. On coming to the city the family decided to live quietly at home until the husband should become established in his new business. For two years she had been deprived of physical exercise, mental relaxation and all recreation, while struggling against adverse financial conditions. I prescribed for her a diet that would bring her state of nutrition to normal and ordered exercise, indoor and outdoor, which was gradually increased as her condition permitted. I found out the church with which she was affiliated, got into communication with some of the members and soon she was enjoying all the benefits they could offer. She joined the Y. W. C. A. and became a member of one of the physical exercise classes, took up swimming, and later tennis. I also prescribed a course of congenial reading and home study. As she had children, I aroused her interest in the outdoor activities of young people. After a talk with her husband, we arranged that some form of outside amusement be given her two evenings each week. We had the pleasure of seeing all symptoms disappear and the patient restored to normal.

Symptomatic Treatment. Anorexia. This is often one of the most persistent symptoms encountered. Where the condition of the patient will justify it, there is nothing that lends itself to relief quite as much as physical activity. Of marked advantage also are cheerful surroundings, proper mental occupation, and all those other factors that work toward a happier state of well-being. No matter how little relish there may be for food, the patient can usually be prevailed upon to take milk, and to this may be gradually added other articles of diet. Sometimes a period of frank starvation is of advantage in the beginning of treatment, followed by milk given at first, an ounce or two at a time at frequent intervals.

Suggestion is of value, particularly when given by the nurse. The appetite usually returns as the condition of the patient improves.

Vomiting. This is sometimes quite constant, and in its management individualization is necessary. For temporary relief small amounts of carbonated drinks, such as ginger ale, are of value. At times relief may be obtained by using ½ fluidounce (15 cc.) of limewater and 1½ fluidounces (45 cc.) of milk every half hour, given ice cold or very hot. Sometimes the patient's reluctance to take food is due to imaginary causes and may be overcome by some spectacular demonstration of his perfect ability to eat and digest a meal. For example one of my confreres in treating a patient who complained that he could not retain food, took him to a hotel, ordered a dinner consisting of such foods as porterhouse steak and hashed brown potatoes, and told him to eat, assuring him that he would be right there to help him in case of disaster. The effect was all that could be desired. In many of the cases, it is better to begin with the simplest possible foods, such as milk and limewater or a glass of milk every hour or two, and gradually to build up the diet as indicated.

When medication is necessary the bromides meet the requirements best. They may be given in 15 to 30 grain (1 to 2 Gm.) doses and should be used only as long as necessary. A noticeable factor in the management of this condition is the promptness with which it often subsides when a change of residence is effected; for example, a patient who at home is unable to retain food at all may have no inconvenience when removed to a sanitarium or properly placed in a hotel.

Diarrhea. This usually subsides under the general measures for the care of the patient as previously outlined. Very often it is the result of improper eating, either in the kind of food taken or in the way it is eaten. The diet should always receive proper consideration. At times the bromides, by relieving the nervous state, will relieve this symptom also. Colon irrigations are often of advantage. More active medication such as bismuth subnitrate or paregoric, if used, should be employed only to the smallest extent necessary to meet definite requirements. A rather frequent finding in the case of women is the association of diarrhea with the menstrual function.

Insomnia. The measures of general care as previously outlined are usually all that are needed to control this symptom. Particular care should be given to secure for the patient the proper conditions for sleeping, such as quiet and comfort. Exercise is of much importance and, as the activity of the patient increases, the symptom usually disappears. Mental occupation and relief from worry and anxiety are always indicated. Hydrotherapy is often of value. Consideration should be given to diet and elimination. Suggestion is, of course, of marked benefit in some cases, and this sometimes may be reinforced by the administration of a placebo, such as a capsule of milk sugar. Where medication is necessary, the bromides or barbital may be used to meet temporary requirements; usually it is an advantage to withdraw these without the patient's knowledge.

Pain. The headache and body pains usually yield to the measures of general care. Where medication is necessary for temporary requirements, such agents may be used as the bromides or acetylsalicylic acid, or some combination of these. Medication for pain in hysteria, however, is seldom necessary or advisable.

Anuria and Polyuria. These usually respond to the measures of general care. Sometimes prompt benefit results from having the patient void at stated times and gradually to widen the intervals. Suggestion is often of value here. These symptoms are seldom of a serious nature.

Paralysis, Contractions, Etc. These symptoms are seldom encountered in general practice. The specialist who receives his cases in large numbers may frequently meet with severe cases of this type. In general practice a physician may go a lifetime without seeing more than mild and transient evidences of this character. In their management, aside from the matter of general care, the employment of massage and manipulation is of value. Hydrotherapy and suggestion may be of benefit. Electricity may at times be used to advantage. It should be borne in mind that prolonged disuse or prolonged fixation in a definite position may cause actual organic changes, such as atrophy of the muscles or ankylosis of the joints, which call for special measures.

Acute Paroxysms. This is one of the most disturbing phases of this condition, and may occur in any one of a great variety of forms, such as prolonged periods of laughing or crying, or apparent coma, or convulsions. The management of these depend upon many factors and no set rule can be laid down. The inconvenience entailed to the patient and others is such that in many cases prompt and energetic measures are necessary. In other cases the physician can well afford to temporize, and it is probable that expediency is a matter that often has to be considered. For example, to relieve the patient of an acute paroxysm the strenuous measures sometimes employed may render the physician persona non grata and prevent the possibility of his being of further benefit. I can probably best illustrate the management of these phenomena of hysteria by briefly citing a few illustrations: elements of malingering are included in some.

Mr. S. a druggist about 40 years of age. I was called one night and obtained the following history: He was naturally of a neuropathic make-up. His store had burned that night, he had reached the scene too late to be of service and had started laughing and had been laughing over two hours when I was called. Under some circumstances I could understand the owner laughing while his store burned, but this man had a prosperous business and was practically without insurance. I gave him a hypodermic of $\frac{1}{10}$ grain (0.006 Gm.) of apomorphine hydrochloride. He promptly emptied his stomach, went to sleep and slept for about ten hours. His wife was on a visit to a neighboring state and, before I was called, he had managed to instruct someone to wire her that he was ruined financially and in a serious condition. When he awoke from the effect of the apomorphine, he experienced little discomfort except general body soreness, and had taken up his affairs again as though nothing had happened. Later in the day he was handed a telegram which he hastily opened, expecting to find words of sympathy and understanding and the news that his wife was hastening to him. It seemed, however, that his friend, for fear of unnecessarily alarming the wife, had sent her a message so indefinite that she had entirely misunderstood it, so Mr. S. upon opening the message read the following, "I am having a good time, will be home next month." He again started laughing. Here also we might say that under some circumstances we can understand a man's laughing upon receipt of such information, but he and his wife were a thoroughly congenial couple and the return of his former trouble was the result of shock, as in the first instance. I was again called, but was delayed in getting to see him. When I did arrive, he was unable to speak, but indicated to me that he did not want a hypodermic of apomorphine. I tried various other remedies without effect and finally he requested by signs that I repeat the former dose, which I did with satisfactory results. When he recovered from the sleep that followed this administration, I took pains to have awaiting him the message that he desired and had expected. His affairs were adjusted on a more favorable basis than he had at first expected and, through the liberality of a relative, he was enabled to weather the financial stress and had no further return of hysteria major.

Mrs. N. was sent to me by a physician from a neighboring state. He had diagnosed the case as hysteria, but had been unable to isolate her from her family and carry out what he knew to be the necessary measures of treatment. I sent her to a general hospital and in a short time received a phone message that they would be unable to keep her unless something could be done, as she was having convulsions during which she tried to do herself bodily injury, by jumping out of the window. If anything else had been needed to establish the diagnosis, that type of convulsive seizure would have met the requirements. After I had made a thorough investigation of the case, I tried out the following plan with perfect results.

After a consultation with the head nurse on that service I had her go with me to the room of the patient and there had a talk with her about the case. Standing by the bedside of Mrs. N. I stated to the nurse that apparently the condition was such that we could confidently expect her recovery and return to a normal state of well-being from every standpoint and that as far as the convulsions were concerned, that there was a type of treatment that would give prompt relief. I then told the nurse that when the patient had a return of the convulsions, if she would empty a bucket of crushed ice into a bath tub of water and immerse the patient up to the chin, letting her remain for twenty or thirty minutes, she would find that the condition would subside without further effort. During the six weeks that the patient spent in the institution there were no further symptoms of convulsions. Needless to say these instructions were understood by the attendant to be for effect only and not to be carried out. I might add that, while the results obtained by the institutional treatment were apparently perfect, the patient had a return of the old condition upon going home and being subjected to the former environment.

In many cases results can be obtained merely by having everyone leave the room and keeping the patient under observation without letting her be aware of it. The stomach pump may be used to advantage. Often there is a large element of fraud in these cases. For example, J. M., a boy about fifteen, was subject to epilepsy. He had an indulgent family who relaxed all discipline after one of these attacks and showered him with attentions. He soon learned to simulate fairly well the convulsions of epilepsy, and would do so when he desired to secure any particular concession in the domestic establishment. Suspecting this state of affairs by the seizures not running true to form, I had a frank talk with him in the presence of his family, called their attention to the difference in the paroxysms, and was able to shame and reason him out of this practice.

Mrs. E. was a neurotic individual subject to attacks of hysteria major. I was called one night and found the family in the greatest distress. The patient had a seizure punctuated with periods of screaming that rendered prompt action necessary. While I was preparing the hypodermic of apomorphine, I explained to the family in her presence that there was nothing alarming in her condition and that she would be all right in a short time. Following the hypodermic she emptied her stomach and went to sleep. She came to my office the next day in a distinctly disgruntled state and complained that I had ruined all of her plans on my recent visit, that things had not been going to suit her for some time and everything was just coming her way when I came in and spoiled it. I laughingly told her that under the circumstances she should have posted me before having me called. She started to leave the office, hesitated, seemed a little embarrassed, and said, "I feel that I am going to have another of those attacks tonight." I had some difficulty in persuading her from it.

One of the most difficult tasks is to secure the coöperation of the domestic establishment. It is often necessary to explain to the family that the patient's life is not in jeopardy, and to give them some understanding of the true state of affairs. The difficulty is to do this and at the same time let them understand that the individual needs the greatest possible care and attention. I must confess that my own experience in acquainting the family with the fact that the case is hysteria has been rather unsatisfactory. The average man associates the word hysteria with humbuggery and is apt to lose all sympathy with the one affected. There are few things in medicine that require more diplomacy.

It is also necessary to use the same amount of care in giving the patient information that may be necessary. It is sometimes better to let these matters gradually develop as the case progresses. Let me give an illustration that is rather typical.

Mrs. N. a case of typical hysteria. They were people of wealth, and I was frequently called when there was no actual medical necessity. I was very doubtful about the way the family would receive the information that there was nothing organically wrong and that the case was one of pure hysteria. I finally had the husband come to my office and tried to explain to him that while there was no organic disease, the patient was suffering from a condition that required care in its management. I tried to the best of my ability to give him a true conception of hysteria as we understand it. When he left I felt rather proud of the manner in which I had discharged my mission. I had given him to understand that a large part of the visits that I was being asked to make were unnecessary, but that if he wished these continued with the information in hand my conscience would be clear. Upon leaving my office he went immediately home not even waiting for the closing of his place of business, and told his wife that he had just had a talk with the doctor who said there was not a blank! thing the matter with her, therefore, for her to "shut up, and get up." Needless to say my standing with the household was materially impaired and it took me a long time again to reestablish myself so as to gain reasonable control of the case.

INSOMNIA

General Statement.—Sleep is one of the most conservative processes of nature. It is an arrangement by which the body and the mind secure the maximum amount of rest. It is absolutely essential to continued existence. An individual may go for a period of days without sleep; beyond this, nature seems unable to adapt the various processes that go to make up life.

The value and necessity of sleep may be regarded from two standpoints:

First, the amount of sleep that in health is necessary to favor the maintenance of the best possible stage of well-being.

Second, the amount of sleep that is desirable for a patient to have in a state of disease.

Amount of Sleep Required. There is considerable difference of opinion in regard to this matter and always has been. There is probably a wide range in the requirements of different individuals, and by the same individual under different circumstances. It is certainly true that persons taking active physical exercise require more sleep in order to establish sufficient recuperation.

Again, the age of the individual has much to do with the requirements. The new-born infants sleeps from twenty to twenty-two hours out of the twenty-four, the amount gradually diminishing until early adult life is reached, when it seems to follow a fairly even course until advanced years. Late in life the tendency is toward fewer hours.

Moses, who handed on to humanity some of the wisest hygienic laws that the race has ever known, is said to have included in these the division of time into three parts—eight hours for work, eight hours for recreation, eight hours for sleep. It is probable that this is as near to the ideal as is humanly possible to attain.

There have been some men of colossal genius who have recommended quite a different arrangement. For example: It is stated that Napoleon slept only about four hours in each twenty-four, and claimed that this more nearly met the requirements of humanity.

Edison has taken a somewhat similar position, claiming that the health of a man and his efficiency are increased by conforming to such a schedule.

Pseudoinsomnia. Many individuals, particularly old people, are not conscious of the amount of sleep they obtain and will complain often of having lain awake practically all night, when, as a matter of fact, they have slept well except for infrequent and short intervals. In evaluating the statements of patients in regard to this matter, it is always better not to depend entirely on their own opinion, but to make investigation.

Causes of Insomnia.—There are many causes and an understanding of these is of major importance in directing teatment.

Unfavorable Facilities. This is one of the most important factors. An uncomfortable bed or uncomfortable sleeping garments are sometimes at fault. These can easily be corrected.

An uncomfortable room, particularly one that is overheated or poorly ventilated, may be the cause or outside noises, such as those made by dogs or cats. A common disturbance of this kind is from noisy neighbors, those who are practicing on musical instruments or learning to sing. Insomnia may sometimes result from a change of location. A person may find considerable difficulty in adjusting himself to a more noisy street or to a new type of noise.

Sleeping with Someone Who is Restless. This is a very common source of trouble, particularly with mothers who look after children. It is sometimes a matter of marked distress in newly married couples. In boarding schools it is not unusual to find students who have been accustomed to sleeping by themselves having considerable difficulty in accustoming themselves to rooming with others.

Faulty Habits. This includes quite a wide range of conditions.

Indiscreet eating at night is very well expressed in the lines of the old poem:

"Friend, if through thy troubled mind,
Such midnight visions sweep,
Spare! Oh spare the evening meal;
And sweet will be thy sleep."

Over-indulgence in caffeine-containing beverages, such as tea and coffee, are frequently at fault. We are probably prone to overlook the effect of caffeine and the variable quantity contained in the different varieties of coffee. Caffeine in physiological dosage acts first as a stimulant; this is followed by a period of relaxation. If too much is taken, the preliminary period of stimulation passes into one of excitation, the main characteristic of which is wakefulness.

Going to bed in an improper frame of mind is a frequent source of trouble. For example: Children who retire excited from romping or from reading exciting literature or hearing stories of a disturbing nature, often have difficulty in getting to sleep and, instead of restful repose, have either periods of wakefulness or a troubled sleep punctuated with bad dreams.

Adults are apt to take their troubles to bed with them, or go over the affairs of the day and plan for the morrow. This is a most unfortunate habit and should be discouraged. I remember that, as a drug clerk, I once tried to train my memory by the plan of trying after retiring to recall all the prescriptions I had filled during that day and going over every detail of the process of their preparation. In the course of time I succeeded very well in this, but found to my dismay that I had almost lost the habit of sleep, and the correction was made with considerable difficulty.

Mental and Nervous Conditions. This has been touched upon to a certain extent in the preceding paragraph on "Faulty Habits."

The high strung, nervous type of individual is usually one that is troubled with insomnia and measures directed towards establishing the nervous balance have a direct tendency towards relieving this condition. It has been said that we should never eat except when the mind is in a pleasant state of repose. The same might be applied to a certain extent to retiring at sleep time. It is certainly desirable to try to prepare ourselves for sleep when the time approaches.

Diseases. One of the most distressing of the discomforts of ill health is wakefulness. Some types of sickness are more characterized by this condition than others, for example, a diseased tooth may interfere with sleep for weeks or respiratory obstruction render restful repose impossible. This group of disturbing diseases includes such as enlarged tonsils, enlarged adenoid bodies, indigestion, diarrhea, pruritus, high blood pressure, asthma, arthritis, and nervous disorders.

Treatment. General Care.—This is the most important phase of treatment and the one that should be employed exclusively in the majority of cases.

Comfort. One of the first considerations is to make the individual comfortable. This includes the removal of any source of distress; such, for example, as the pain of a diseased tooth, the itching of a skin eruption, or the discomfort of indigestion. The patient should have the benefit of a comfortable bed, comfortable night-garments, properly ventilated room, freedom from noise and confusion, and there should be no disturbing element such as a restless bedfellow.

Habit. We are largely creatures of habit, and very much can be accomplished by having a definite sleeping-time and adhering to it. This is a matter of major importance in the correction of insomnia. Under this head might also be included the correction of habits that tend to prevent sleep, such as indiscreet eating, over-indulgence in beverages containing caffeine and excessive smoking.

Mental Attitude. Anything that will be conducive to the individual's being in a quiet, comfortable state of mind at bed time will favor his having a normal period of rest.

Sometimes much can be done here by suggestion and often these individuals can do much for themselves by applying autosuggestion. They can be taught to banish care, put aside the worries of the day, avoid exciting literature, and try in every way to prepare themselves for sleep. Some light, pleasant reading, like the works of Mark Twain may be of considerable assistance. In many cases the reading of something that is rather boring and tiresome is conducive to sleep. Any doctor can look back to his student days and remember the difficulty he had in staying awake while he poured over the pages of Gray's Anatomy. I know one patient who cured himself of insomnia by studying a treatise on ancient philosophy in which he was not at all interested. He claimed that after a few pages, not only was he ready to go to sleep, but found it impossible to stay awake.

Many are able to induce sleep by banishing from their minds thought processes. Sometimes aid is rendered by such devices as the old one of counting sheep going over the brow of a hill or taking a hundred slow deep breaths.

Diet. In a general way proper diet favors a state of well-being and all the normal processes of nature, sleep included. Many persons find it difficult to sleep if their evening meal has been too heavy or if it has been of an indigestible nature. On the other hand, a comfortably filled stomach is conducive to sleep. Intelligent patients can often do a certain amount of experimenting with themselves and learn as to the amount of nutrition that is best for them. A small amount of warm, plain, soft food at bedtime is often of value. For this purpose a glass of hot milk or a cup of hot cocoa may be used.

Exercise. This is a valuable factor in correcting and maintaining a general state of well-being. Good, wholesome exercise particularly lends itself to relaxation and sleep. When a person who is not organically diseased is troubled with insomnia, and there is no contra-indication to exercise, a fairly large amount of recreation may be taken to advantage. This can include golf, tennis, walking, hunting, fishing, swimming, and any other activities that are suited to the general condition and desires of the individual. Of particular advantage in many cases is ten to fifteen minutes of military setting-up exercises just before retiring.

The practice of bathing is one in which there is a considerable range in the reaction of different persons. Some seem to sleep better after the hot bath, others after the cold bath and rub-down. In the case of others, any type of bath seems to lessen the tendency to sleep. These may be tried out and one adopted if found desirable.

Medication.—In sickness medication may have to be immediately resorted to. For individuals who are not organically ill, medication may be used as a last resort, or employed to tide over until by the use of other measures a habit of sleep is established. Among the drugs used are the following.

Barbital. This is given in doses of 3 to 5 grains (0.2 to 0.3 Gm.). It is usually administered in some hot drink, as milk. It is a highly efficient hypnotic and while it carries over a certain amount of depression into the following day, it does so to a less degree than some other drugs that are employed.

Luminal is used in doses of from ½ to 2 grains (0.03 to 0.13 Gm.). It should be remembered that barbital and luminal belong to the group of barbituric acid compounds and that the use of any of these is fraught with a considerable element of danger.

Bromides. These are more sedative then hypnotic, but they may aid in relieving insomnia, and it is possible that this action is largely through their sedative quality.

Many other drugs and combinations of drugs have been recommended, such as chloral hydrate, sulphonmethane and elixir of paraldehyde. These may be useful at times.

Codeine. For temporary use, in sickness, this is a valuable agent. It is one of the opiates but has a very small element of habit forming quality, if any. It has the advantages over morphine of interfering less with elimination, and that fewer patients have an idiosyncrasy for it.

Morphine. This is the most reliable hypnotic known when sleeplessness is due to pain. Its efficiency here is almost perfect, except in those rare cases that have an idiosyncrasy for it. There are some disadvantages to the use of morphine, such as its interference with elimination, but at the same time it occasionally meets the requirements when nothing else will.

Apomorphine. The hypnotic quality of this agent is often overlooked, and in some texts on materia medica is not even mentioned. It is the most powerful hypnotic known to science and is particularly of value in conditions such as hysteria, mania and alcoholic psychosis. The main disadvantage of this drug is the preliminary stage of nausea that it induces, but the hypnotic after effect develops rapidly, is of considerable duration, and almost certain in its occurrence.

MIGRAINE

General Statement. **Definition.**—This is a condition characterized by paroxysms of pain confined principally to one side of the face and usually associated with more or less definite phenomena, as nausea and vomiting. Among the synonyms that are frequently employed are sick-headache and hemicrania.

Incidence.—While almost all classes or conditions of people may be affected, it is more common among women and is most frequently observed between the periods corresponding to puberty and the menopause. The condition may occur among young children or be found in advanced age. It is probably more frequent among the intellectual than among the laboring classes.

Etiology.—This is still rather imperfectly understood. Heredity is a factor, but it is probable that this phase of the etiology has been over-stressed. Some family history of other deviations from the normal is usually found but it is rather hard to establish to what extent this is a coincidence. For example, in three cases recently investigated one presented a history that was absolutely free from irregularity, one had a more or less general family history of nervous instability and lessened vitality, and in one the patient's mother had a mild type of hysteria and his only sister had a congenital club-foot.

Mental strain often seems to be a deciding factor in those predisposed.

An impaired physical condition, particularly mal-nutrition, seems to be concerned in the etiology of some cases. The internal secretions are still being studied in their relation to this disease. One of the main factors to be considered here is the tendency for migraine to develop about the time of puberty, and in the case of women to subside or lessen in severity at the menopause. It also seems in many cases to have a definite connection with pelvic disturbances; for example, some cases will be more or less free from it during pregnancy.

Defective teeth may play a more important role than medical observers usually acknowledge; it is probable, however, that it is not as material a factor as the modern dentist would have us believe. Occasionally spectacular results follow the removal of diseased teeth.

Eye strain has been credited with causing a large part of this disease some observers placing this as the exciting cause in as many as 65 per cent of the cases.

Hyperacidity is probably one of the most common causes of migraine, and some of the best results are obtained by correcting this gastric disturbance. Thompson placed hyperchlorhydria as the cause percipitating 25 per cent of the attacks; my own observation has led me to believe that the percentage is more than 50. Among other causes that seem at times connected with the development of the acute attacks are excesses, such as over indulgence in alcohol, tobacco, coffee, or food.

Course and Prognosis.—The acute attack subsides in the course of a few hours to several days. It sometimes presents such distress as to cause genuine alarm, but serious results are hardly to be considered. The prognosis as to repeated attacks will depend largely upon the history of the case; that is as to how long the condition has obtained, the frequency of the attacks, whether a cause can be located, and the extent to which the patient will cooperate in treatment. There is a marked tendency to chronicity. As previously mentioned, many cases subside toward the end of the period of sexual activity.

Symptoms and Diagnosis.—In establishing a diagnosis of this condition the history is of large importance. It should include an investigation as to the same or a related condition occurring in other members of the family; the matter of previous attacks; and the exclusion of other factors that might account for the symptoms present.

Onset. In many cases this is preceded by a few hours of what might be termed aura. There are no consistent evidences of coming attacks that would apply to all cases. The individual who has experienced repeated attacks of this condition can often tell when one is approaching. Among these evidences are such as transient pains in the head, dizziness, anorexia, nausea, and sometimes disturbances of vision or nervous instability.

Pain. This is the characteristic symptom and is markedly severe. It is usually confined almost entirely to one side of the face, often centering around the eye, though as it progresses the discomfort may be experienced in both sides of the face, over the entire head, or sometimes in the neck.

The pain is usually increased by any disturbances even such as the slight jar that would be caused by someone walking across the room or striking the bed on which the patient is lying. Noise also increases the discomfort. Photophobia is usually marked. The patient often complains of bizarre sensations such as flashes of light, these sometimes assuming various colors. They may complain of a boring sensation in the eye or some adjacent region or any one of many other peculiar sensations, the origin of which is difficult to explain.

Gastric Symptoms. Nausea and vomiting are the rule. Sometimes the emptying of the stomach gives a certain measure of relief; in other cases, the disturbance of emesis seems to increase the pain. The patients complain particularly of the ropy, tenacious character of the vomited material. This nausea in some cases is experienced only in the early stages of the attack, and in others it is more or less persistent throughout.

Special Disturbances. These include such phenomena as disturbances of vision or hearing. In the severer cases, there may be pronounced motor phenomena. The mentality is often impaired or there may be a tendency to delirium or partial coma.

Differential Diagnosis.—When the patient is subject to repeated attacks, the diagnosis is comparatively easy. Sometimes when one is first seen in acute paroxysm and a satisfactory history cannot be obtained, the case may present some difficulty. The unilateral type of pain, the absence of febrile reaction, and the presence of sensory and gastric disturbances will tend to differentiate the vast majority of cases.

Prophylaxis.—In the effort to prevent the recurrence of these attacks in those that are disposed, much can be done. Of considerable importance is the attention to the general health of the individual; this should be kept up to the highest possible standard and a high state of nutrition maintained. Any possible cause of trouble, such as diseased teeth or pelvic abnormality, must receive attention. Proper living should be enforced. The patient should maintain the proper balance between work, rest, sleep, and recreation. Excesses along any lines must be avoided. A very frequent source of trouble is the mental and physical strain so often incurred by active, high-strung, intellectual women in their church and philanthropic activities. A woman can come as near working herself into a state of complete exhaustion in carrying on her domestic affairs and engaging in outside activities for church and social improvement as in any other known way.

Avoidance of eye strain should always be arranged, this often includes the wearing of proper glasses.

The diet should always be of a bland character, free from highly seasoned foods and not contain an over amount of proteins.

The avoidance or correction of hyperchlorhydria is a factor of major importance that can not be overestimated. All of these will be discussed in detail under the head of treatment.

Treatment. General Care.—During the acute attack rest in bed is imperative; this rest should be both mental and physical. Every disturbing factor should be eliminated. Where possible a competent trained nurse should be in charge and the family excluded. The patient should be in a comfortable, properly heated, and well ventilated room; as nearly excluded from the rest of the household as is practicable; and entirely out of the way of noises. It is particularly undesirable to have odors from the kitchen to reach the patient, as it accentuates the tendency to nausea. Hot or cold applications to the head may sometimes be of benefit, these may be in the form of compresses, a hot water bottle, an electric pad, or an ice bag. The patient should be given the usual care of the mouth and skin.

Elimination. This should be properly maintained throughout. A preliminary purgative is desirable, though it is sometimes difficult to have it retained. Among the satisfactory agents is milk of magnesia which may be given in doses of ½ fluidounce (15 cc.) every half hour until effective. An enema of ½ ounce of sodium bicarbonate in half a gallon of warm water will sometimes be of benefit.

Diet.—During the acute attacks there are usually complete anorexia and intolerance of food. Excellent results may often be obtained by the use of ½ fluidounce (15 cc.) of lime water in 1½ fluidounces (45 cc.) of cold milk every half hour, all other food being withheld. As the condition improves other articles of diet may be added, depending upon the desire and the tolerance of the patient; these may include such items as cereal broths, strained soups, malted milk and later well cooked cereals, dry toast and butter. The diet should be cautiously increased as convalescence progresses.

Medication.—Many patients will be able to give a history of some particular remedy that gives the maximum of relief, in which case it is usually well worth trying. At times it is rather difficult to have any medication retained by mouth. There is no specific and the treatment is largely symptomatic. For the relief of pain one of the following prescriptions may be of advantage:

℞		or	
Barbitali,			
Acetphenetidini,			
Acidi Acetylsal.,	āā gr. x		6
M. ft. cap. no. vj			
Sig.—One every two hours till relieved.			

℞		or	
Codeinæ Sulph.,	gr. ij		13
Barbitali,	gr. xv	1	00
Acidi Acetylsal.,	gr. xxv	1	60
M. ft. cap. no. viij			
Sig.—One every two hours till relieved.			

These not only lessen the pain but tend to allay nervousness and to promote sleep. Where there is gastric intolerance excellent results may often be obtained by using the following:

℞		or	
Barbitali,			
Acidi Acetylsal.,	āā gr. xx	1	3
M. ft. cht. no. ii			
Sig.—Use one by enema as directed.			

One of these powders is dissolved in ½ fluidounce (15 cc.) of whiskey or brandy, four fluidounces (120 cc.) of warm water added and the solution used as a retention enema.

The distressing nausea which not only disturbs the patient but intereferes with the rest of the treatment may be relieved by some of the following measures: Carbonated drinks, such as seltzer or ginger ale in small amounts. Milk and lime water as previously recommended. A teaspoonful of sodium bicarbonate in a few fluidounces of seltzer water. The following prescription will sometimes be of assistance:

℞		or
Sodii Bromidi,	ʒij	8|0
Sodii Bicarbonatis,	ʒij	8|0
Potassii Citratis,	ʒvj	22|0
Aquæ,	q.s. f℥iij	90|0

M.
Sig.—Tablespoonful as directed.

This may be given by mouth every two hours until relieved. In case of gastric intolerance the dose may be doubled, put in about 4 fluidounces (120 cc.) of water, and given by enema.

The use of alkalies and bromides should be stressed in this condition.

Other Drugs. Codeine by needle in ½ to 1 grain (0.03 to 0.06 Gm.) doses is often of marked advantage. Morphine is frequently employed but its value is questionable. It sometimes accentuates the nausea and may interfere with elimination. Migraine is a chronic disease and the tendency to habit formation must be considered. Many other drugs have been recommended such as acetanilid, caffeine and atropine. Some highly competent observers such as Durkin and Gilpin who have done much experimental work in this condition place considerable reliance upon cannabis indica.

In addition to the necessary measures for the temporary relief of acute pain and nausea, I wish to urge consideration of the full treatment for hyperchlorhydria (See page 457). The results are sometimes spectacular.

CHOREA

General Statement. Definition.—Chorea is a term used to designate a group of more or less related conditions. The name is derived from the Greek word meaning dance, and has been applied to any one of a number of conditions that are characterized by involuntary movements. Mordaunt in his excellent article has described as many as ten varieties, but he and most authorities seem to believe that it is best to confine the word chorea to the one disease that is commonly known as Sydenham's chorea. Many synonyms have been employed particularly Saint Vitus' dance. It is this condition, and this only, that will be discussed here. The degenerative group known as Huntington's chorea, the hysterical group, and the various others are best included in the special literature dealing with such conditions.

This disease is an acute nervous disorder characterized by irregular and incoordinated movements possessing certain distinct characteristics. There are usually associated psychic and nutritional disturbances. The disease may be found in varying degrees of intensity, and is usually classed as mild, severe, and malignant. The last group really belongs to the serious organic nervous diseases.

Incidence.—The great majority of these cases occur between the ages of five and fifteen years, though some have been reported at all periods of life. Those developing after puberty are usually among women; and it is also probable that these late cases are those with whom preceding attacks had been so mild as to pass unnoticed. The condition is more common among girls than boys, the proportion being about two or three to one. It seems to be more common in city than in country life, and to have a greater tendency to develop in the spring of the year. It is most frequent among mentally active, high-strung individuals.

Etiology.—This has not been definitely established. Hereditary nervous instabilty seems to play a definite part as a predisposing cause. Among contributing causes are such factors as overwork, particularly where there is mental strain such as is often found in school children who take their work seriously; under-nutrition; impaired general health; shock; excitement; and other conditions that tend to lessen nervous stability. Certain infectious diseases exert an unquestionable influence on the incidence and the consensus of opinion is that chorea is one of the group with acute rheumatic fever and tonsillitis.

Course and Prognosis.—The duration of attacks usually ranges from six weeks to six months; some writers place the majority of cases as ranging from six to twelve weeks. There is a distinct tendency to recurrences. The prognosis depends largely upon the general condition of the patient from a nervous and physical standpoint. The age of onset is a factor, also the severity of the particular attack. The presence or absence of endocarditis and myocarditis is one of the principal considerations determining the outlook.

Symptoms and Diagnosis. History. This should include the family tendency as to nervous instability, or stigma of degeneration, and an investigation as to those conditions that seem to be of etiological importance, such as shock, mental or nervous strain, or infectious diseases, particularly tonsillitis and rheumatic fever.

Onset. The condition is usually noticed only after the choreiform movements have definitely developed. It is usually possible to obtain a history of a preceding period of nervous instability such as sleeplessness, a tendency to excitement, and irritability. In some cases the condition begins with apparent abruptness, following some particular stress.

Character of Movements. These usually begin on one side and most commonly are noticed as incoordinated movements of the hand, which are accentuated by efforts at control or by the attention of the patient being directed to them. The condition is often first evidenced by the tendency of the patient to drop anything held in the hand, or to knock over things reached for. Many a little patient has been unnecessarily disciplined for acts over which she had no control, before the disease was recognized. The movements are best described as being purposeless entirely or an abnormal termination of what would have been a normal movement. There is a marked absence of muscular coordination. While the condition may begin on one side, it usually becomes bilateral. The extremities are most often involved, though almost any group of muscles may be affected, such as those of the face or neck. In the mild cases, comparatively little inconvenience is experienced; in the severer forms the satisfactory use of the hands may be largely or entirely lost and walking may be much impaired or even become impossible. Swallowing or speech may be more or less interfered with. Respiration may be disturbed to the extent of giving rise to a rather labored, jerky type of movement. There is usually more or less muscular weakness. Disturbances of sensation are not unusual, though not often pronounced.

Nervous Phenomena. These are fairly constant and include such conditions as nervousness, restlessness, irritability, and insomnia; the mentality is usually unimpaired.

Other Symptoms. There is a decided tendency to disturbances of nutrition, and very often this is one of the most distressing features of the case. Anemia is quite common. The heart shows a distressingly large percentage of involvement, the lesions being those of a past or present endocarditis or myocarditis.

Differential Diagnosis.—The principal diseases from which this must be differentiated are hysteria and those organic conditions that are the result of degenerative changes, as the so-called Huntington's chorea. The diagnosis will depend upon the careful evaluation of all the available evidence. The progress of the case to recovery in the usual time would, of course, confirm a diagnosis, particularly as differentiated from the degenerative types.

Prophylaxis.—The prevention of recurrences will be discussed under the head of treatment. The prevention of the development of the primary condition is a matter that presents difficulties, due to the fact that the disease is fairly rare, the possible contributing causes are many, and the actual etiology still somewhat uncertain. In a general way it may be said that all measures looking towards healthy, normal childhood, in the development of mind as well as of body, would naturally be prophylactic for this condition. The attention to diseased tonsils and the prevention of rheumatic fever are of paramount importance. This is one of the conditions that gives grounds for protesting against mental and physical overwork in childhood, and leads us to encourage fresh air, sunshine, and a high state of nutrition. Of importance also is the matter of so managing the child as to develop nervous stability.

Treatment.—Of major importance are those measures looking towards a high state of general health. This includes attention to any morbid process in the body, particularly possible foci of infection, such as diseased tonsils. Due consideration should be given to fresh air and sunshine and proper clothing.

General Care. Rest. This should be complete if possible, depending upon the condition of the patient. The severer cases certainly require a period of absolute rest in bed. These patients should be removed from school, if they are in attendance. They should be given no mental work and provided only with sufficient mental or physical activity to give them the proper amount of diversion. They should be encouraged to sleep as much as possible, as sleep is particularly beneficial, due to the cessation of the movements during this period. The surroundings should be cheerful and soothing. It is particularly necessary to avoid any confusion or mental excitement and the nursing should be arranged with this in view, all unpleasant subjects being avoided, as well as anything tending toward excitement. In most cases a change from home surroundings will be highly beneficial, and treating the case in a sanitarium has many advantages. Some country or seashore resort, is desirable during convalescence.

Diet. The food should be bland and easily digested, and yet of such a character as to develop a proper state of nutrition. The diet may include milk, buttermilk, butter, cereals, plain breads, potatoes, fruits, and soft vegetables. Milk can be given as such or in the form of milk shakes, milk cocoa, milk soups, milk on fruits and cereals, and in many other ways.

Symptomatic Treatment. Digestive Disturbances. These may usually be corrected by proper attention to diet. Elimination should be maintained by the use of mild laxatives as indicated, and purging avoided. Among the laxatives that are of value are olive oil, liquid petrolatum, milk of magnesia, and aromatic fluidextract of cascara.

Nervous Symptoms. The nervousness, irritability and sleeplessness, may require the use of some sedative as the bromides, barbital, luminal or codeine. These agents should be employed only to meet temporary requirements, and given only in amounts sufficient to give the necessary results.

Anemia. This would indicate the use of iron. Depending upon the age of the patient, it may be given as the solution of iron and manganese peptonate or as pills of ferrous carbonate.

Special Medication. Salicylates. The value of salicylates is still a matter of dispute as many cases seem to respond favorably and others not at all. Where tonsillitis or rheumatic fever seem to have been a direct factor in the etiology, the judicious use of the salicylates would certainly be indicated. Sodium salicylate is the salt of choice. It should be given with sodium bicarbonate to avoid gastric irritation. The use of this agent should not be persisted in if results are not obtained in a reasonable length of time.

Arsenic. This seems to be the most generally used and is probably the most valuable drug in the treatment of this condition. The preparation of choice is the solution of potassium arsenite (Fowler's solution). It is employed in large doses, but it is best to begin with a relatively small dose and increase until signs of intolerance develop. The first of these is usually edema, particularly a puffiness under the eyelids in the mornings. The dose may then be reduced to one-half until the toxic symptoms disappear, when it is again gradually increased. In the beginning, the dose for an average adult is from 3 to 5 minims (0.2 to 0.3 cc.) a child weighing 50 pounds may begin with one or two minims (0.06 to 0.12 cc.) three times a day, this to be increased a drop every second or third day until beneficial results are obtained or toxic symptoms develop. If edema is evidenced, say when the patient is getting 10 minims (0.6 cc.) three times a day, the drug may be discontinued for one or two days and then resumed with 5 minims (0.3 cc.) The urine should be carefully watched for evidences of renal irritation, as albuminuria or casts. The skin should be observed for unfavorable developments, particularly pigmentation. It must be borne in mind that arsenic is a poisonous drug and, if long continued in considerable amounts, may give rise to chronic poisoning. These patients, however, will often tolerate considerable amounts for a long period, and fortunately, edema is a fairly good index of the individual's tolerance. Other preparations have been employed such as arsenic trioxide by mouth, sodium cocodylate hypodermically, and arsphenamine intravenously.

Many other agents have been recommended such as antipyrine, potassium iodide, and cimicifuga. Magnesium sulphate has been used intravenously. Serum therapy has been rather extensively employed.

EPILEPSY

General Statement. Definition.—Epilepsy is a condition characterized by certain phenomena including partial or complete loss of consciousness, with or without convulsions, followed by a more or less prompt return to normal without appreciable after-effects. It is rather difficult to give a concise definition owing to the great number of types that come under this designation. One classification is that based upon severity, the disease being divided into petit mal and grand mal; the first being without convulsions or more than transient loss of consciousness, the second presenting frank convulsions and complete unconsciousness. Such types are also recognized as Jacksonian, senile and cardiac.

Incidence.—Almost any age, sex, type or race may be affected. It most commonly appears among young people.

Etiology.—As to the actual cause of this condition, there is still much uncertainty, and students differ widely in some of their opinions. Heredity is unquestionably a factor of first importance and not only is epilepsy a family characteristic as such, but an hereditary nervous imbalance lends itself to the development of this condition. Injury is at times a cause, particularly for that group known as traumatic or Jacksonian epilepsy. Alcoholism has been considered of importance both in the individual, and from the standpoint of faulty development due to alcoholism in the parents; it is probable, however, that much of this data has developed from the fact that the intellectually defective are more apt to be alcoholics than are normal individuals. Acute diseases of childhood may have some influence. There are certain indefinite factors that seem to play a part either in establishing the tendency, or in bringing on particular attacks, and in many cases the family or the individual can prevent convulsions by avoiding those conditions that are fraught with danger. For instance, I know one boy who is very fond of pork, particularly sausage. His family keep him away from it as much as possible, but occasionally he breaks out, gorges himself on this forbidden article, and ends the spree with one or more convulsions. I had another case, of a young man who during several years' observation never had an attack except after a night of social dissipation. His particular group of friends were given to "barn dances," devoting practically the entire night to these gatherings. He would usually have one or more convulsions the next day. I was never able to get a very reliable history as to whether at all or to what extent he indulged in other dissipations on these occasions. In women the menstrual function is often a factor, and it is not unusual to find cases that begin about the time of the onset of catamenia or that seem to be affected by the monthly period or by gestation.

Course and Prognosis.—The condition once established has a marked tendency to persist. In some cases the disease can be apparently cured, in others it can be largely ameliorated while in others practically no impression can be made upon the progress. Much depends upon the extent to which the patient can, or will, cooperate in treatment, the age at which the condition develops, and the frequency of the attacks. The milder forms and those occuring later in life having a more favorable outlook. The prognosis as to an individual attack is almost uniformly favorable, as after a more or less definite period of unconsciousness the patient returns to normal, in fact there is usually an increased feeling of well-being following a paroxysm.

Symptoms and Diagnosis.—The history of the case is of importance, particularly that of previous attacks, of a condition that might lead to the development of epilepsy, or that would indicate some other cause for the condition of the patient and, therefore, tend to exclude epilepsy. A family tendency to nervous imbalance should always be looked for.

Petit Mal.—In the mild types, that is those that are free from definite convulsions, there may be any one or more of various phenomena, Among these are the following: A transient giddiness or dizziness without actual falling; the individual may be seen to grasp at something to steady himself, probably taking on a peculiar expression for a fraction of a minute and then going ahead as though nothing had happened. At times there may be a short period of babbling or irrational sentences or a repetition of some particular word or phrase; the individual then picks up the thread of his conversation just where he left off. There may or may not be noted premonitory symptoms of these attacks taking any one of several forms and covering a period of minutes or hours. The patient or the family may recognize these as the premonitions of a coming attack. This aura may be evidenced as irritability, restlessness, headache, or hallucinations.

Grand Mal.—There may or may not be aura somewhat as described in the preceding paragraph. There is a convulsion followed by a period of unconsciousness, which may or may not be followed by a more or less natural sleep. The patient falls without any effort to protect himself, and the scars resulting from injuries in previous falls are among the most valuable differentiating points in establishing a diagnosis. There is a marked tendency for the patient to bite the tongue, differentiating the condition from hysteria major. Rarely there may be involuntary micturition or defecation.

Differential Diagnosis.—Among the particular conditions that often have to be differentiated are hysteria, malingering, syncope, and convulsions of cardiac, renal, or other origin.

In the case of hysteria, the history is of particular importance, also the absence of injury or evidences of previous injuries; the hysteria patients seldom hurt themselves. The convulsion of hysteria seldom runs true to form, and there is seldom total unconsciousness or loss of speech control. There are usually some bizarre evidences in hysteria in contrast to epilepsy; these features also obtain in cases of malingering.

Simply syncope is not characterized by convulsions, but only by loss of consciousness. In cases of poisoning and in convulsions due to renal, cardiac, or other organic diseases, the diagnosis depends upon the history of the case, the character of the seizure, the evidence of previous attacks, and findings indicative of the causative condition. For example, in the convulsion of nephritis there are usually present the signs of nephritis, such as edema, changes in the blood pressure, and casts, blood and albumin in the urine. Many individuals who are subject to epileptic seizures carry a card in their pocket giving the necessary data, and in all cases where an individual is found unconscious, this card should be looked for. Patients are often saved much inconvenience by observing this precaution.

Prophylaxis.—This must begin with eugenics, and the laity should know that the condition is distinctly hereditary and the possibility of its being transmitted may be fairly well approximated by applying the well known law of Mendel. The proper management of childhood conditions, particularly where there is a tendency to convulsions, is a factor that is often overlooked and yet is one of importance. Proper attention to head injuries, including prompt surgical measures when indicated is another factor that is sometimes of importance. Prophylaxis as to individual attacks will be discussed under the head of treatment.

Treatment.—This may well be divided into the management of the acute attacks and the relief or cure of the condition as a whole. Care of the acute attack will be discussed under a separate heading.

General Care.—The consensus of medical opinion today tends toward attaching more importance to this phase of treatment. No hard and fast rules can be laid down. The first consideration is to find from a careful history of the case and from an investigation of of the family tendencies any particular condition that predisposes to an acute attack and to prevent the development of this condition. As a rule these patients are much benefited by attention to the many details looking toward maintaining the best possible state of well-being. There should be a proper balance between rest, recreation, sleep, and activity. An outdoor life is desirable, and the clinics for the treatment of epilepsy have taken advantage of this with excellent results. These patients should avoid excitement, mental strain, and physical exhaustion. They should sleep somewhat more than the average; they should be given the benefit of proper ventilation, proper covering and clothing. They should have sufficient mental diversion. They should be trained in general hygiene, particularly the daily cleansing bath and proper attention to the mouth. They should avoid all excesses, particularly the use of alcohol and tobacco. They should avoid those vocations or recreations that might be dangerous should an acute attack develop. This would include automobile driving, swimming, and working upon high buildings or scaffolding. The epileptic should not be a railway engineer, a boat pilot, or in fact should not participate in any activity that might be particularly dangerous to himself or to others.

Elimination. This should be carefully maintained without unnecessary purging. Constipation, directly or indirectly seems to be a factor in many cases. It may be combatted by the use of a laxative diet, or olive oil, liquid petrolatum, or a more active purgative as aromatic cascara, may be used as indicated. Many have recommended regular colon irrigations.

Diet. This should receive every possible attention. In many cases a fairly good idea can be obtained of certain types of food that are particularly unfavorable, and these, of course, should be carefully avoided. As a rule a bland simple diet that is well within the digestive ability and yet up to the nutritional need can be easily arranged.

This should include particularly such articles of food as milk products, cereals, fruits, and soft vegetables. Meats should at most be taken in moderation.

Medication. Bromides. Many believe that in the effort to control the frequency of the convulsions potassium bromide is the most valuable agent. It should be given in whatever amount is found to be the minimum necessary to produce the desired effect, that is, of course, if it acts favorably at all. It seems that the majority of cases obtain the best results by the use of comparatively small doses, about 15 grains (1 Gm.) twice a day. The plan often followed is to begin with this amount (for an adult) and to increase to three times a day or give larger doses if indicated. If the attacks are nocturnal, fifteen grains (1 Gm.) may be given at morning and noon, and thirty grains (2 Gm.) at night. As the paroxysms cease, the dose is gradually reduced until they reappear, when it is again increased gradually until the amount is finally ascertained that will meet the requirements. This is continued for a period of years. An old rule used to be to maintain the necessary dosage until the patient had been free from convulsions for three years; this was rather an arbitrary ruling and not intended to be followed uniformly. Sometimes other agents are combined with the bromide as shown in the following frequently used prescription:

℞		or
Potassii Bromidi,	℥j	30|0
Liq. Potas. Arsenitis,	fʒij	8|0
Flext. Casc. Sag. Arom.,	fʒiv	15|0
Aquæ,	q.s. f℥iv	120|0
M.		

Sig.—Teaspoonful in water night and morning.

There are two particular disadvantages in the use of the bromides. One is the depressing effect. Many patients do not seem to experience any inconvenience whatever, while others complain of impaired mental efficiency and a sense of general depression. I knew of one case, a boy who had taken bromide every day throughout his entire school years and had graduated from grammar school, high school, and college with honors. I knew another boy who during the time of taking bromide was free from convulsions, but unable to meet his school requirements. He could discontinue the drug, meet all his school requirements, but would have a return of the convulsions.

Another disadvantage is a tendency to skin eruptions. This sometimes takes the form of persistent sores particularly on the face or neck, though they may appear on any part of the body. They are almost entirely resistant to treatment as long as the use of the drug is continued.

It is claimed by some that arsenic will prevent the development of the eruption, but the experience of others has not been favorable.

Luminal. This is used principally as luminal-sodium and is being extensively employed at this time. The usual dose is from 1 to 3 grains (0.06. to 0.2 Gm.) given two or three times a day. Many report highly favorable results, while the experience of others has been rather unsatisfactory. It certainly has a large field of usefulness, but like all barbituric acid compounds is not without danger and must be used with caution.

Glandular Therapy. This is a field that offers much promise, but nothing very satisfactory has as yet developed.

Management of Convulsions.—When the patient is aware of an approaching attack, it is at times possible to bring to bear such factors as rest and sedatives, that will tend to prevent the development of the paroxysm. I have never had a case where such was possible. Amyl nitrite has been recommended for the same purpose, and is carried by the patient in the form of pearls, one of which is crushed in a handkerchief when the approach of an attack is felt. As a rule the convulsion develops without sufficient premonition for therapeutic effort to be of value, and then the best plan is merely to make the individual as comfortable as possible until the paroxysm has subsided. Every effort should be made to prevent the biting of the tongue. This may be accomplished by inserting something between the teeth, care being taken not to use a hard object that might cause injury. Following the attack the patient should be allowed to rest until a more or less normal condition returns. One who is subject to these attacks should always carry a card in his pocket that will give all necessary information as to identification and first aid measures.

CONVULSIONS OF CHILDHOOD

General Statement.—Convulsions of childhood may be divided into three groups. First, those that occur very soon after birth and are usually the result of accidents of labor, especially intra-cranial hemorrhage. This group is not included in the present discussion, as the subject belongs more particularly to obstetrics or pediatrics. Suffice to say, that the relief of intra-cranial tension by lumber puncture, and the encouragement of coagulation by serum, or better, by whole blood given subcutaneously, are the accepted treatment. Second, those that are the direct result of acute infectious diseases or other definitely established causes. Third, those that develop from minor causes, often from no demonstrable cause whatever, in this respect very closely resembling epilepsy.

Incidence.—Convulsions may occur at any time during childhood; as the individual progresses in years, the tendency diminishes. There seems to be a particular susceptibility to this condition during the second and third years of life.

Etiology.—It is impossible to enumerate all of the causes that may be factors in the induction of the seizures. Heredity plays an important part; that is, the patient may inherite a nervous instability. It is not unusual to see families in which all or a majority have been affected in this way, and other families in which convulsions are unknown. The nervous, highstrung type of child is naturally more susceptible. The inherently frail child is also more often affected.

Acute infectious diseases play a very important role. In childhood measles, pneumonia, and many other diseases may be ushered in with a convulsion. This seems to take the place of a chill in the adult.

Many children are peculiarly susceptible to convulsive seizures in any condition accompanied by high temperature. It is not unusual to find mothers greatly alarmed at the appearance of fever in a child, because they know from past experience that convulsions are probable or at least possible.

Gastric or intestinal indigestion accounts for a comparatively large group of these cases. It is a well established fact that many cases are due to intestinal parasites, and are relieved by treatment of the primary trouble.

The rôle played by dentrition is still unsettled. To one who is susceptible to these seizures, the direct or indirect disturbance resulting from dentition may be the unbalancing factor.

Fright or excitement may cause convulsions in a susceptible child. All physicians of experience can remember cases where a child in a condition favorable to the development of these seizures has had them precipitated even by such things as the slamming of a door or a loudly spoken word.

Almost any cause that disturbs the child's equilibrium may produce convulsions. For example, a child who had swallowed an open safety-pin developed convulsions, having them at frequent intervals. This continued until the foreign body had been removed, when the seizures became less frequent and finally ceased.

Course and Prognosis.—The outlook depends largely upon the etiology, the general condition of the patient, and the promptness with which measures for relief are instituted. Death may result from the primary cause, from exhaustion, or from interference with the respiratory or circulatory functions. The vast majority of cases recover. A child known to have had convulsions once should always be considered as a potential case for recurrence. Repeated convulsive seizures seem to establish a habit or at least to increase the susceptibility of the individual.

Symptoms and Diagnosis.—Thorough search should always be made for the primary cause after the first attack, and the child kept under observation until this phase of the subject has been cleared up.

History. This is naturally of importance in establishing both the character and the cause of the attack. For example, if a history is obtained of indiscretions in diet of a type that is known to have caused convulsions in the same patient in the past, the chance of some disease being the cause is naturally lessened.

Onset. In many instances this is sudden, a convulsion coming on without any one having been aware of any previous indisposition.

In the majority of instances a history can be obtained of what might be called a pre-convulsive state. This is characterized by such symptoms as nervousness, irritability, and often twitchings of groups of muscles. An attack may be prevented at times by recognition of the prodromal symptoms and institution of the proper preventive measures.

Character of Seizures. They usually begin with a tonic spasm which rapidly passes into the clonic type or the seizure may be clonic throughout. The muscular involvement is usually general. There is a tendency for the eyes to be rolled upward, though they may be turned to one side, or there may be strabismus. The seizure may last anywhere from a few minutes to an hour or more, subsiding gradually, and usually followed by rather profound sleep. There may be frothing at the mouth, particularly in cases of long duration. There is usually fever, though this is not a constant symptom. At times the fever may be quite high and, as previously stated, the precipitating cause of convulsions in many cases is hyperpyrexia. There is a tendency for an increased pulse rate; the respiration is naturally embarrassed. In protracted cases there is almost always cyanosis. There is usually complete loss of consciousness which often merges into natural sleep. The attacks may be ushed in with crying, and the clonic spasm interfering with the respiratory function often gives rise to a grunting sound. The tongue may be bitten, though in childhood convulsions this is rather unusual as compared with seizures in adults. There is a marked tendency to more or less pulmonary edema, particularly in protracted cases. Very often the aspiration of mucous from the mouth may closely simulate pulmonary edema and cause unnecessary alarm. There may be involuntary passage of urine or intestinal contents, though this is decidedly the exception.

Prophylaxis.—Particularly in those cases that are known to be susceptible to convulsive seizures, every possible care should be taken in the matter of general health. There is no doubt that this not only tends to lessen the tendency to attacks, but also to make the prognosis more hopeful. All conditions that are known to be causes should be either avoided or eliminated; this would include attention to intestinal parasites, diseased tonsils, etc. Indigestion and constipation should be particularly avoided. Many patients are known to be susceptible to convulsions in the presence of fever, in which cases care should be exercised to prevent the development of high temperature, and in acute illnesses the use of an antipyretic is certainly justified. The family should be instructed to apply promptly for medical attention when sickness develops in these cases and in the meantime unless contra-indicated, to give a purgative (preferably castor oil), use a colon irrigation, apply an ice bag to the head, and give a dose of acetylsalicylic acid. The patient should also be protected from noise, excitement or any factor that might exercise an unfavorable influence.

Treatment.—Of primary importance is finding the cause and giving it prompt attention. There are certain measures, however, that must be carried out to relieve the seizure, as no matter what the cause, the treatment of these attacks is practically the same. Frequently before the physician reaches the case many of the well-known measures for relief have been instituted.

Hot Mustard Bath. This should be prepared as hot as can be tolerated by the child, and sufficient water used to immerse the entire body up to the chin. Where mustard is not available hot water alone may be used. The rubefacient action of mustard is, however, a valuable part of this measure. The mustard should not be immediately put into hot water, but first stirred into lukewarm water and hot water added. The duration of this mustard bath may be several minutes, the exact time being determined by the reaction of the patient. During the bath a cold compress should be applied to the head. Following the bath, the child should be rapidly dried, wrapped in warm blankets and an ice bag applied to the head. External heat can be maintained by the use of hot water bottles or an electric pad. It is highly desirable that these measures be carried out rapidly and without confusion. If undecided as to what should be done first, the attendant should be guided by what first can be arranged for. It is the custom of many to give an enema while the child is in the mustard bath, and then have it rapidly rinsed off in hot water before being wrapped in the blankets.

Quiet. This is one of the most important factors in the management of these cases. The neighbors often gather and discuss the case in loud tones as they restlessly move about, each trying to do something to help. It is best to empty the room of all except those who are needed to assist. This quiet should be rigidly maintained until the patient has returned to normal. As previosuly stated, the loud slamming of a door or a loudly spoken word may precipitate another convulsion.

Purgative. As a rule these patients during a convulsion cannot swallow, but, as soon as they can, a purgative should be administered. There is probably nothing that will met the requirements here as well as castor oil, which should be given in large doses. Calomel is often used, but is slower in action, and quick results are highly desirable. Calomel may be used later, if indicated.

Diet. No food is required at this time. Nourishment should be begun when indicated by the condition of the patient and then with extreme caution, as any indiscretion is liable to precipitate a recurrence.

Special Medication.—In the case of high temperature, particularly where there is a history of previous convulsions resulting from hyperpyrexia, acetylsalicylic acid will often give excellent results. If the child is not in a condition to swallow consciously, the dose may be moistened and placed inside the cheek, it will usually be unconsciously swallowed. Or the drug may be given by enema; for example, in a child about three years old, 2 grains (0.12 Gm.) each of acetylsalicylic acid and barbital may be dissolved in about 30 minims (2 cc.)

of whiskey or brandy, put in 2 fluid ounces (60 cc.) of water (at a temperature of about 100°F.) and given by rectum.

Another prescription that has been extensively employed is the following:

(For a child 3 years old)

℞		or
Chlorali Hydratis,	gr. xv	1│0
Sodii Bromidi,	gr. xxx	2│0
Aquæ,	q.s. f℥ij	60│0

M.
Sig.—Teaspoonful every hour till relieved.

This is given by mouth if possible; if not, the dose is doubled, put in an ounce of lukewarm water and administered by rectum. In some cases a hypodermic of morphine and atropine may be indicated; the dose should depend upon the size, age, and condition of the patient. This remedy should be used with extreme care or much damage may be done. Following the period of the convulsions there is a tendency to coma; and, if in addition to this natural tendency, there is the effect of much morphine, the chances of recovery may be lessened.

Many other agents have been recommended, such as antipyrin in combination with bromides or chloral, and codeine by needle or otherwise.

Anesthetics. Some use chloroform by inhalation. I am in accord with many others who believe that this remedy is inadvisable. There is no doubt as to its immediate effect in tending to control the seizure, but the ultimate results do not justify its use. In other words, the patient may pay too great a price for the symptomatic relief.

After Care. These cases should be under proper observation, preferably in the care of a trained nurse, for a considerable period after an attack. The medical attendant should always stay with the case until the convulsion subsides and should see the patient at short intervals until completely restored to normal, and until any serious condition that is found to be the cause of the seizure has been eliminated.

DISEASES OF THE ENDOCRINE GLANDS

HYPERTHYROIDIA

General Statement.—There is the widest possible divergence of opinion among the various authors as to the nomenclature, classification, etiology, and particularly the treatment of this condition. The same lack of agreement is found in the consideration of the entire subject of goiters.

Definition.—Hyperthyroidia is a condition characterized by an excessive secretory activity of the thyroid gland with the resultant systematic changes. It occurs in toxic adenoma, and in exophthalmic goiter. The latter is also frequently called Graves' disease or Basedow's disease.

Incidence.—It is found everywhere and in all classes and conditions of humanity. It is much more common among women, the usual proportion being about five to one. The principal age of onset is between fifteen and forty, the majority of cases developing in the earlier part of this period. This disease is much more common in some sections than in others. It is particularly endemic in certain parts of Southern Europe. In the United States it is probably most common in the Middle West. It seems to develop with greater frequency during periods of stress, such as epidemics, famines, and wars.

Etiology.—As previously stated, there is no unanimity of opinion among the many students of this disease as to the etiological factors. The consensus of opinion places them in three general groups:

1. Toxic. These include foci of infection in the body, particularly in the tonsils, teeth and gums, as well as intestinal toxemia. Sajous in particular advances much convincing data supporting the contention that a common source is the absorption of bacterial toxins from the digestive tract. Against this theory as to etiology is the fact that while goiter is more common among females they maintain better oral hygiene and have less tonsil infection.

2. Psycho-neural. This includes excessive mental effort, anger, grief, fright, and any form of psychic trauma.

3. This group includes other factors not previously enumerated, such as endocrine dyscrasias, nervous instability, heredity, age, sex, and previously existing simple goiter. Supporting the theory of the internal secretions playing an important rôle is the marked tendency for thyroid disturbances to develop at the ages of puberty and menopause.

Course and Prognosis.—This is extremely variable. Many cases have a rapid and uneventful recovery, others are protracted into years of more or less disability, and some follow a rapidly progressive downward course. There may be remissions and even intermissions. In exophthalmic goiter there is a tendency to a period of comparative improvement before the onset of vasodilation and other attendant phenomena.

Symptoms and Diagnosis.—These vary considerably with the duration of the disease, the severity of the involvement, and the character of the treatment.

History. The principal points of interest here are heredity as to goiter and nervous instability; gain or loss of weight; and the character of the onset.

Onset. Plummer from his wide experience has given the order of evidence somewhat as follows: Cerebral stimulation, vasomotor isturbances of the skin, tremor, mental irritability, tachycardia, loss of strength, cardiac insufficiency, exophthalmos, diarrhea, vomiting, mental depression, and jaundice.

There may be impaired mental efficiency, restlessness, irritability and insomnia, headache, pseudo-angina, areas of hyperesthesia, tingling or numbness in the extremities, more or less paralysis, muscular spasms, tinnitus aurium, and exaggerated reflexes.

Circulatory Symptoms. There is an increased pulse rate, which may reach an extreme degree, 100 to 150 not being unusual. In toxic adenoma, there is usually an increased blood pressure and particularly pulse pressure. In exopthalmic goiter, if there be an increased blood pressure, it is transient. Later the condition is characterized by vasodilation with a consequent falling pressure. Sooner or later there is cardiac dilation, and at any period, but particularly late in the disease, there is a marked tendency to functional murmurs. Epistaxis or hemorrhage elsewhere occasionally develops. Late in the disease there is a tendency to the more serious forms of arhythmia, particularly auricular fibrillation and to cardiac insufficiency with its attendant phenomena.

Gastro-intestinal Symptoms. There may be a markedly increased desire for food, though some cases are characterized by erratic appetite or complete anorexia. Dyspepsia is quite frequent and there may be hyperchlorhydria with the usual symptoms. Thirst, nausea, vomiting and diarrhea are quite frequent.

State of Nutrition. There is a decided tendency to loss of weight, which may be very rapid and extreme in degree. Late in the disease there may be edema.

Weakness. One of the early manifestations is impaired physical efficiency. This is at first noticed as an inability to endure sustained physical effort.

Skin. In addition to vasomotor disturbances, there is a tendency to sweating. The skin becomes dry and rough to the touch. There may be only one, of quite a variety of lesions, such as eczema, erythema and pruritus. The nails and hair may be affected in a marked degree.

Temperature. Fever is not a characteristic symptom of prominence, though most cases show some elevation at times.

Thyroid Gland. In exophthalmic goiter, there is a palpable tumor in only about one fourth of the cases. In toxic adenoma, of course, an appreciable enlargement is to be expected.

Exophthalmos. In Graves' disease more or less exophthalmos is the rule, though it may develop quite late in the process. It is hardly necessary here to give in detail the various signs indicative of that condition. In most cases it is quite evident.

Sexual Phenomena. There may be sexual anesthesia, amenorrhea, menorrhagia, and in some cases a premature menopause.

Laboratory. There is little here that is characteristic. The urine may show albumin, casts, or other evidences of renal irritation. Also an increase in uric acid and phosphates. There may be an increase in lymphocytes and a reduction in leukocytes. A basal metabolism test indicates an increase in oxygen consumption which may be from 50 to 75 per cent.

Special Tests. Thyroid. A careful administration of thyroid gives an increase in the symptoms except in the end stage of this disease.

Adrenalin. The Goetsch test is made by the administration of epinephrin, 0.5 cc. of 1 to 1000 solution. A positive reaction is shown by an early rise in blood pressure and pulse rate.

Loewi's Test. This test depends upon the dilation of the pupil when epinephrin solution is dropped into the eye.

Prophylaxis.—According to Sajous, one of the principal prophylactic measures is the proper attention to foci of infection in the body, particularly in the mouth, teeth, and throat; and the avoidance of intestinal toxemia by proper elimination and care as to the character of drinking water and food. At the present time much work is being done in the use of iodine. This is usually employed in the form of sodium iodide, or the compound solution of iodine. The compound solution which seems to be the preparation of common choice is employed in a total daily administration of from one to three drops, for a period of about two weeks twice a year. A precautionary measure of importance is the removal of the patient from a locality in which goiter is endemic. This applies particularly to those who have a family history of special susceptibility.

Treatment.—There is so great a divergence of opinion in medical literature today that one almost hesitates to make a definite statement as to the value of any therapeutic measure. So much has been recommended and so much condemned, that we must conclude that there is no specific. There are certain measures, however, that can be recommended with a certain degree of confidence.

There is no argument against and many arguments in favor of a thorough investigation of the patient for possible foci of infection and removal of these should they be found. This applies particularly to the tonsils, teeth, and gums.

Rest. A certain amount of rest is necessary in the majority of cases. It is essential for the patient during periods of nervous phenomena, and when physical exertion produces evidences of cardiac insufficiency. The rest should be both mental and physical. In fact, of the two mental rest is often the more important. The requirements here may vary from a mild restriction of mental and physical activity to absolute rest in bed under trained supervision, and preferably in an institution. The duration of this measure will depend upon the reaction of the patient. As soon as conditions will permit, fresh air, sunshine, carefully supervised activity and mental diversion are certainly desirable.

During the period of confinement to bed, an icebag to the head, or to the neck, or both, may be of advantage.

Under all circumstances bodily cleanliness must be maintained and thorough oral asepsis.

Elimination may require the use of mild laxatives or enemas. There is much evidence in favor of colon irrigation, not only to maintain sufficient elimination, but as part of the treatment It can do no harm and is worthy of trial.

Diet. As there is a marked tendency to emaciation, the diet must be nutritious. The caloric intake must be governed by the state of nutrition of the patient. As there is often dyspepsia, nausea, and diarrhea, it is best that the food be of such a character as to be easily digested and to leave a minimum of refuse. There is so much evidence in favor of an intestinal factor in the etiology that it would seem desirable to limit the protein intake, particularly the meats that would be most apt to cause trouble. The mainstay of the diet is milk. This may be given in any amount that can be handled by the individual. Among the other articles of value in most cases are butter, buttermilk, cream cheese, well cooked cereals, breads, fruits, soft vegetables, soft boiled eggs, white meat of poultry and fish. Olive oil, plain or in the form of dressings, should be encouraged. If there is much emaciation, the fats and carbohydrates should be particularly emphasized.

General Medication.—Among the drugs that are most used today are the following:

Arsenic. In the form of trioxide or one of the solutions, particularly potassium arsenite (Fowler's solution).

Calcium. The lactate and the glycerophosphates are most used.

The Salicylates. Usually as acetylsalicylic acid or sodium salicylate.

Quinine hydrobromide.

Ergot. Usually the extract is employed.

Thyroid Gland. The dessicated product is most often used.

Iodine. Either in the form of the iodides or the tincture or the compound solution.

The iodine treatment is one of the oldest measures used, and has been carefully set forth in literature. It has been revived recently and put upon a more acceptable basis. The principal precaution to be observed in its use is to avoid converting a benign into a toxic adenoma. Under all circumstances the drug should be used with extreme care and the patient kept under observation. During the first few days of treatment the patient should be seen daily. A common method of employment is to begin with about one drop of the compound solution of iodine three times a day and increase one drop each day until ten or fifteen drops have been reached, unless the patient has sufficiently improved, or unfavorable symptoms have developed. When improvement takes place, it is customary to reduce the dose to about five drops total per day, which may be continued for an indefinite period.

The salicylates and quinine hydrobromide are employed especially in the effort to lessen thyroid activity.

Symptomatic Treatment. Cardiac Insufficiency. This is treated with digitalis or quinidine sulphate, just as the same condition arising from other causes.

Neuro-psychic Phenomena. The usual measures of general care, particularly mental and physical rest, may meet all the requirements. It is at times advisable to give bromides, chloral hydrate, barbital, or other sedatives. These should be employed only to meet the definite needs and discontinued as soon as conditions will justify it.

Gastro-intestinal Disturbances. These are best counteracted by rest, careful diet, and the other measures of general care. Otherwise, they are treated just as the same conditions arising from other causes.

Special Measures. X-ray and Radium. Excellent results have been claimed for these. They should be employed only by experts. The contention has been raised that should surgery be necessary later the previous use of these may make the operation more difficult.

Injections. Among these hot water has been employed most often. There is uncertainty as to the benefits, and an element of danger.

Surgery. The surgical group of the profession usually take the position that all forms of goiter are distinctly surgical conditions and that medical measures are of value only in putting the patient in proper condition for operation, and in post-operative care. The medical wing of the profession is inclined to feel that surgery should be resorted to only when medical measures have failed to give relief. In many cases operative measures are certainly indicated.

MISCELLANEOUS

PELLAGRA

General Statement. Definition.—Pellagra is a disease of unproven etiology and presenting certain rather definite characteristics including skin lesions, gastro-intestinal disturbances, and involvement of the central nervous system.

No satisfactory classification has been suggested, though a case may be predominately cutaneous, gastro-intestinal or nervous in type.

Incidence.—The disease was first recognized in Southern Europe and it is still endemic there. It is confined almost entirely to the tropical sections of the world. Some years ago it was quite prevalent in the Southern United States, but is less frequently found there now. It is more common among those living under unfavorable hygienic conditions, but not confined to this group. The incidence is higher among women. It is most often observed during the summer months, due largely to the seasonal course of the process.

Etiology.—The cause is still uncertain though many theories have been advanced and some of them backed by considerable evidence. Among these are the following:

Damaged Corn. This was the first, and obtained much credence.

Unbalanced Diet. This is the one at present most generally accepted.

Infectious. A remarkable array of evidence has been brought forward to support this contention.

Transmitted by Insects. The buffalo gnat and the stable fly have been particularly incriminated.

It is hardly of advantage here to enter into a detailed discussion of these theories.

Among predisposing or contributing causes would certainly seem to be unhygienic living conditions, summer months, exposure to sunshine, tropical climate and female sex.

Course and Prognosis.—The disease is essentially chronic and highly resistant to treatment. There is a tendency to marked exacerbations during the summer months and remissions or intermissions during the winter. Recurrences among the apparently cured are not uncommon. The mortality varies considerably in different localities, but is always high enough to place this among the most serious of diseases. A prognosis should always be guarded.

Symptoms and Diagnosis. History. This is one of the most important factors in establishing a diagnosis. The following points are of particular interest: the social and domestic status and general living conditions, particularly the diet; residence in a community where the disease is endemic; the duration and seasonal character of the process and its resistance to previous treatment.

Onset. This is almost always insidious, the first symptoms noticed usually being lowered physical efficiency. Following this, and somewhat in irregular order, there may be anorexia, nervous instability, indigestion and a sense of burning in the mouth.

General Symptoms. Fever is not a characteristic evidence though at times there may be some elevation of temperature. The pulse and respiration are not out of proportion to the general condition of the patient. There is a tendency to reduction in blood pressure.

Laboratory. There is nothing characteristic in the findings here. As the disease develops, there is usually a secondary anemia.

Cutaneous Lesions. These may be entirely absent throughout the course of the disease. They also may vary considerably depending to some extent on the stage of the process. A careful investigation of the history will usually show that the skin involvement developed only after the patient had been affected for several months.

There are two principal types of lesion: one being erythematous in character; the other, bullous. Either of these on subsiding leaves pigmented areas. They are largely confined to the parts of the body that are exposed to the rays of the sun, such as the backs of the hands, the wrists, the back of the neck and the prominences of the face. A dermatitis of the malar eminences and the bridge of the nose sometimes gives rise to the classical "butterfly" lesion. The skin manifestations are naturally influenced to some extent by the character of clothing worn. Those who go barefooted may have the feet or shins invaded. Often the yoke or shoulder straps of a garment can be distinctly outlined by the cutaneous lesions.

The erythematous type has a tendency to harden and crack, leaving painful fissures that are slow in healing. The bullous type may develop considerable ulceration and is most resistant to treatment.

Gastro-intestinal Disturbances. Among these are anorexia, indigestion, nausea, diarrhea and dysentery. There may be considerable abdominal pain. The entire mucous membrane of the alimentary tract may be involved in a pathological process. The tongue is usually red or coated, the mouth and pharynx red and uncomfortable.

Cerebral and Nerve Involvement. Both the brain and the spinal cord may be the sites of pathological changes. There is a tendency to a depressive psychosis though mania at times develops. The most common finding here is a dull apathy with a tendency toward melancholia. The spinal cord changes may give rise to muscular atrophy and an ataxic gait.

Differential Diagnosis.—This at times is difficult or impossible, but in the majority of cases presents few difficulties. When both the cutaneous and gastro-intestinal involvement are present, there is no other disease that resembles it sufficiently to cause confusion. Among the conditions most often to be eliminated are simple food-diarrhea; dysentery, particularly amebic; pernicious anemia; and scurvy.

The duration and seasonal character of pellagra even when skin lesions are absent will readily differentiate it from diarrhea or bacillary dysentery. From amebic dysentery it is differentiated by the skin lesions, condition of the mouth, the seasonal character, more marked intermissions, and the absence of amebæ in the stools. From pernicious anemia by a comparison of the blood pictures of the two conditions, which will furnish sufficient evidence. The skin lesions and seasonal character supply additional data.

Prophylaxis.—Too little is known of the etiology to justify any conclusive statements here. Prevention is probably included in those measures looking toward maintaining a perfect state of well-being, particularly favorable hygienic surroundings and a well-balanced diet.

Treatment.—This may best be considered under general care, diet, general medication and symptomatic treatment.

General Care.—Depending upon the condition of the patient, more or less rest is nearly always desirable. Gastro-intestinal involvement calls for absolute confinement to bed.

The treatment quarters should be selected with a view of securing isolation, freedom from noise or other disturbances and proper ventilation. It must also be remembered that the patient is not to be subjected to sunshine, so the shady side of the house is desirable. A bath room should be convenient. The bed should be particularly comfortable as there may be much emaciation.

The mouth, skin, hair, etc., should have due attention.

Ambulant cases should have the skin protected from the rays of the sun. This can be accomplished by wearing proper clothing, gloves, a wide brimmed hat, using an umbrella or only going out in cloudy weather and at night.

Diet.—It is here that most can be accomplished. In certain stages of gastro-intestinal involvement, the digestive ability is markedly lowered and feeding has to be conducted with much care and under many difficulties. It may be necessary for a time to restrict the diet to such articles as the following: Milk diluted with ½ barley water, strained lentil soups with ½ milk, strained cereal broths, fresh meat juice, citrus fruit juices diluted and sweetened with milk sugar, peptonized milk, coffee or tea with milk and milk sugar. The diet should be increased as soon as the condition of the patient will justify it. This should be closely watched.

In the light of our present knowledge, probably the ideal diet and that toward which effort should be directed may be outlined as follows. It should be appetizing, varied and well balanced in the food elements. It should be easily digested and carry a minimum of refuse. It should be up to the nutritional needs of the patient. It should contain among other articles fresh whole milk, raw or coddled fresh eggs, fresh lentils, rare, fresh red meat, and citrus fruits, particularly lemons.

Example of manner of ordering an "ideal diet" for a patient with fair digestive ability and without diarrhea:

Eat three meals a day.

Two hours after meals take an egg-malted-milk.

Diet to include:

- 3 pints of fresh milk.
- 3 raw, fresh eggs.
- ½ pound of rare, broiled or roast beef or mutton.
- Fresh beans and peas (cooked)
- 3 lemons.

The rest of the diet to be selected from: fresh fruits, fresh vegetables, fresh meats (including fish, game, poultry, etc.), dairy products, well cooked cereals, breads and plain desserts.

Egg-malted-milk to be made with:

- 1 whole fresh egg.
- 1 heaping tablespoonful of malted milk.
- Flavor (as 1 tablespoonful of chocolate syrup).
- Ice.
- Fresh, whole milk to fill shaker.

Many prefer to show sufficient respect for the etiological theories by excluding corn products and molasses.

General Medication.—From time to time specifics have been claimed, only to have their value discredited. Among these have been—Arsphenamine, sodium cacodylate, arsenic trioxide, solution of potassium arsenite, calcium sulphide, quinine hydrobromide, and the citrates. Sodium or potassium citrate and lemon juice are the most largely used agents today.

The citrates are used by mouth, hypodermically and intravenously. Lemon juice is administered by having the patient take the juice of several lemons (usually from 2 to 4) each day as lemonade and with the food. It is a measure that we are at least not justified in omitting.

The late Dr. Dyer used to employ as a routine the following prescription:

℞		or
Arseni Trioxidi,	gr. j	06
Ext. Nuc. Vomicæ,	gr. v	30
Quininæ Hydrobrom.,	gr. c	6 60

M. ft. cap. no. xx
Sig.—One capsule three times a day after meals.

Symptomatic Treatment. Cutaneous Lesions. These seldom require much attention. There is no measure of special value. Among the remedies used are the following: simple ointments as cold cream, bismuth paste, zinc oxide ointment and carbolated petrolatum; wet dressings as boric acid solution, potassium permanganate solution (1 to 7500) and witch-hazel. The principal consideration is to protect from the rays of the sun and from trauma, and this is probably best accomplished by a simple ointment covered with sterile dressing.

Gastro-intestinal Disturbances. The matter of diet has already been discussed. Anorexia and nausea can usually be controlled by the measures of general care and a careful manipulation of the diet. The appetite can at times be improved by simple bitter tonics and at certain stages of the disease by diluted hydrochloric acid. Nausea may also be relieved by small amounts of carbonated drinks or the use of bromides.

Diarrhea is much reduced by rest in bed, which together with careful regulation of the diet is usually all that is required. Irrigating the colon with hot cooked starch solution may give relief. Hot applications to the abdomen may be tried. When medication is necessary, bismuth subnitrate alone or combined with paregoric may be employed till the symptom is under control.

Nervous Phenomena. These seldom require special attention. The tendency of the disease to melancholia would indicate the advantage of pleasant surroundings and freedom from mental disturbances. The rather rare cases of an excitative character may require the bromides or luminal.

Climatotherapy. As the development of the disease is almost confined to tropical sections, removal to a more northern part of the country would seem of advantage. The summers which represent the active periods of the process, may at least be spent in some section like the Canadian Mountains or the Great Lakes. Unfortunately the pellagra patient is usually not of the type that can financially afford such possible advantages.

Complications.—There are none worthy of special consideration.

TULAREMIA

General Statement. Definition.—Tularemia is an acute infectious disease caused by the presence in the body of the bacterium tularense and is characterized by certain more or less definite evidences.

Among the synonyms frequently employed are deer-fly fever and rabbit fever. These names are derived from the facts that the deer-fly is the insect which most commonly transmits the disease to man, and that the handling of the uncooked meat of dead rabbits is probably the most common source of infection. This disease is often confused with rat-bite fever, but is an entirely different condition.

Two general types are recognized, the glandular and the typhoid. These will be discussed together except where it is deemed advisable to emphasize some difference.

Much of our knowledge of this disease is due to Dr. Edward Francis, Surgeon, U. S. Public Health Service, who has not only done much in the way of research work, but has collaborated the literature dealing with this subject.

Incidence.—So far, Tularemia has been reported only in the United States and Japan. In this country it has been found in almost every section, the organism having been isolated first in California, and year by year the territory where the disease is endemic having increased. It is most commonly found among those who are particularly exposed to the etiological factors, the majority of cases so far having occurred among hunters, butchers, cooks, and laboratory workers. Men are more susceptible, due to the larger amount of exposure. Any age, nationality or race may be affected.

Etiology.—The direct cause of the disease is the bacterium tularense. The common host of this is certain rodents; so far, only wild rabbits and ground squirrels have been found to be infected. It may be conveyed to man through blood sucking parasites. Among these the wood-tick and deer-fly have been positively incriminated. These infected flies or ticks start a primary lesion at the site of the puncture wound when they draw blood from a human being.

The most common cause of infection is the handling of the uncooked meat of the dead rabbit, and infection seems possible in this way whether or not there is an abrasion of the skin. Eating such meat, or handling the fur of the animal does not seem to be a source of trouble. The conjunctiva has frequently been the point of primary involvement, probably due to the individual's rubbing his eyes with infected fingers. That the disease may be transmitted through the unbroken skin was well demonstrated in Ohara's experiment, where he infected his wife by rubbing infectious material on the back of her hand and washing it off twenty minutes later.

Course and Prognosis.—The incubation period is from one to nine days, with a probable average of from two to five. The mortality so far has been under ten per cent. One attack does not establish complete immunity, one case having been reported of an individual having two attacks two and a half years apart. The usual course is about two or three weeks of fever. Convalescence is extremely slow, and it is often several months before the individual returns to a normal state of well-being. Many have shown more or less impairment, such as difficulty in writing, that has persisted for several years. The average total disability is about six weeks. The disease is particularly dangerous in the presence of preexistent impairment, such as organic heart disease.

Symptoms and Diagnosis. History. Of particular importance here is the history of exposure: this would include occupation; and whether or not the individual has handled the uncooked meat of rabbits, has been recently bitten by blood sucking insects, or has resided in a section where the disease is endemic.

Onset. In most instances this is sudden, often beginning with a chill followed by high fever, and associated with headache and general body pains.

Chill. In a large number of cases this is the first symptom noted, usually it is of a severe type, and there may be repeated chills or rigors. This particularly obtains in that type of the disease showing marked glandular involvement.

Fever. The temperature rises rapidly, in most cases reaching 102° or 104° F. shortly after the onset. This continues from two to three weeks or longer, and usually subsides by lysis. There is a tendency to a remission about the third or fourth day, followed by a rise usually not as high as the initial stage. There is rather a wide variation between the morning and afternoon temperature, and a marked tendency to remissions and later, intermissions.

Sweats. The chill is usually followed by a period of sweating, as is to be expected; but in addition to this, there is a marked tendency to sweating even more than is found in the usual febrile process. One of the reasons for this is probably the marked prostration that is associated with this disease. Night-sweats are particularly common.

Pulse and Respiration. These are usually not out of proportion to the temperature. Later, when prostration becomes pronounced, there is naturally a rise in the pulse rate.

Pain. Local discomfort will be discussed under the head of local manifestations of the disease. In addition to this, there is nearly always severe headache, backache, and much general discomfort in the muscles and joints.

Skin. Some cases have been reported where a light rash has appeared on the face and neck. There is more frequently a papulo-pustular eruption that is most evident on the face, back and thighs. Jaundice is not unusual.

Gastro-intestinal Symptoms. In the early stage there is complete anorexia. This may be persistent and may interfere very much with the well-being of the patient. Nausea and vomiting are sometimes the first symptoms noted and may persist, more or less, throughout the course of the process.

Nervous Phenomena. These are usually marked, and there may be delirium and coma as the disease progresses. The tendency is to the typical "typhoid state."

Prostration. This is one of the most characteristic features of the disease and often reaches an extreme degree. It may be highly resistant to treatment. It is usually several months before the patient returns to his normal state.

Loss of Weight. There is a rapid reduction in weight that seems to be out of proportion to the severity of the disease. Ten to twenty pounds in the course of two or three weeks is not an unusual loss.

Other Symptoms. Nose bleed is not unusual, though it is seldom severe. Frequently there is diarrhea, rarely constipation.

Abdominal Symptoms. Pain and tenderness in the upper abdomen is fairly constant, and also more or less rigidity, due to the involvement of the liver and spleen. When the rigidity of the abdomen does not interfere with palpation, the enlargement of the liver and spleen can usually be established.

Local Lesions. These occur in the glandular type of the disease and include the primary lesion, if any, and lymphadenitis.

Primary Lesions. When the disease is transmitted by the fly or tick, the primary lesion develops at the site of the puncture wound. When the infection is acquired through the handling of the uncooked meat of rabbits, the lesion is usually on a finger or hand. In any event it begins as a papule which early develops into a pustule, then breaks down and sloughs, forming an ulcer. This ulcer averages about one-fourth inch in area and has a punched out appearance and a raised margin. It is painful, acutely inflammatory, and discharges a considerable amount of pus. It is highly resistant to treatment, heals slowly, and often results in considerable scarring. After the lesion heals, there is often some discomfort that is described as burning in character and may persist for many months.

Lymphadenitis. The lymphatics leading from the site of entry of the organism become red, tender, and painful. The related glands soon enlarge and may attain considerable proportions. This particularly applies to the epitrochlear and axillary glands, though others may show involvement. The entire arm may be swollen and painful. The glands give evidence of an acute, inflammatory process, being tender, painful and the overlying skin reddened. There is considerable edema of the surrounding tissue. About fifty per cent of these glands break down and discharge an odorless pus. Those not breaking down usually persist for several months and tend to remain tender, with resultant disability. At times the glandular structures are almost entirely painless. It should be remembered that this lymphadenitis may result even when there is not a primary lesion evident.

Typhoid Type. A number of cases of laboratory workers have been reported that showed no primary lesion or lymphadenitis, with the exception of an occasional involvement of the cervical glands. There was no local soreness or muscular disuse of any of the members. The constitutional symptoms were practically the same as in the other types of the disease. The process is somewhat milder in a general way. The mode of infection is unknown.

Laboratory. Urine. There is nothing of diagnostic value to be obtained by urinalysis. Occasionally there may be found albumin and casts, as in other febrile processes.

Blood. The blood count may be normal, though there is usually an increase in the total white count ranging from 10,000 to 16,000. There may be an increase in the neutrophiles, though the count is seldom more than 75 to 85 per cent. Later there is a secondary anemia.

Agglutinins appear in the blood during the second week and increase until about the end of the fourth week when there is a gradual decline, though in most cases they persist for several years. The absolute diagnosis is established by agglutination. The blood of the suspected individual may be sent to the Hygienic Laboratory at Washington, D. C. At least 0.5 cc. should be sent, and it is recommended that it be mixed with an equal amount of pure neutral glycerin as a preservative, and that no other antiseptic be used.

Pus from the local lesions may be negative to culture. Guinea pig injection is fairly prompt and reasonably certain in its results. Suspected material may be injected into the abdominal cavity or even rubbed on the skin of the animals. In positive cases the guinea pig dies within three to five days and will show the characteristic necrotic areas in the liver and spleen.

Differential Diagnosis.—The most common diseases that may be confused with Tularemia are tuberculosis, typhoid fever and septic infections. The laboratory is the "court of last appeal." Of particular importance in Tularemia are the results of the agglutination test and guinea pig injection.

Tuberculosis. The only type of the disease that may be confusing is tuberculous adenitis. A microscopic examination of an excised gland will give a positive differentiation. Tuberculosis is slower in its development, is a less destructive process, and is attended by less inflammatory evidence. There is usually tuberculosis elsewhere in the patient and an absence of the history of the etiological factors of Tularemia. Where Tularemia shows a primary lesion with inflamed lymphatics leading from it, there should be no possible confusion.

Typhoid Fever. Confusion is only possible in differentiating this from the typhoid type of Tularemia which so far has occurred only in laboratory workers, and among these only when they have been handling animals infected with this specific disease. In typhoid fever early blood cultures may show the specific organism; later the Widal reaction will usually give evidence. In typhoid fever there is not a tendency for the pain and tenderness to be confined to the upper abdomen; there is not the same rapid enlargement of the liver and spleen; and there is usually the characteristic rose-spot eruption of typhoid that cannot be confused with the papular eruption sometimes found in Tularemia.

Septic Infection. This can only be confused with those cases having a primary lesion. The primary lesion in Tularemia is characteristic, showing an early slough which leaves the punched out ulcer with raised margins. The result of blood examination and guinea pig injection will establish a diagnosis if these methods of investigation are employed.

Prophylaxis.—The primary consideration would, naturally, be the avoidance of the bite of the deer-fly and wood-tick, and care in the handling of dead rabbits. The possibility of infecting the conjunctiva should also be borne in mind. Laboratory workers in investigating this disease should certainly wear rubber gloves and use every reasonable precaution, as the incidence among this class has been rather large.

At least one case has been reported where the infection resulted from handling a patient suffering from the disease. The possibility of this as a source of trouble should certainly be borne in mind, and it does not seem an unreasonable precaution for doctors and nurses to be as careful here as they would be in handling erysipelas and other highly infectious conditions.

Treatment.—No specific, nor anything approaching it, has yet been developed. Effort, therefore, is directed principally along the lines of the general care of the patient.

General Care.—There are certain factors that should be borne in mind. Among these are the following: The patient is possibly infectious. The process is of long duration and is attended with much discomfort. There is marked prostration and loss of weight. There is a fairly high mortality.

Absolute rest in bed is essential. Particularly in the glandular type, every effort should be made to promote comfort as there may be many weeks during which any movement is attended with pain. It is necessary to have a comfortable bed in a room that can be properly ventilated and warmed. Clothing and covering should be such as are most pleasing to the patient. As in all illness, there should be a daily cleansing bath and proper attention to oral hygiene. During the febrile process an ice bag may be kept to the head, and a hot water bottle or electric pad to the feet, as indicated. Much water should be given, as in all other toxic processes. Elimination should be maintained, but active purgation avoided, as there is a decided tendency to prostration.

Diet. Among other considerations here, we must remember that there is usually a rapid loss of weight and that we are facing a long drawn out process, during which nutrition may become a factor of decided importance. During the early stages of the disease there may be complete anorexia, and there is often much nausea and vomiting. It is probable that the typhoid type of diet will meet the requirements as well as anything that could be suggested. No arbitrary plan should be followed, but each case individualized.

At first the diet may consist of carbonated drinks, strained soups or broths (cooked with cereal and one-half milk added), fruit juices (with milk sugar), tea and coffee, and malted milk or some similar preparation. Just as soon as the gastro-intestinal symptoms will permit, the diet should be increased, just as in typhoid fever, by the addition of such items as gelatin, custard, soft boiled eggs, well cooked cereals, toast, butter, etc.

General Medication.—Neoarsphenamine seems to be the drug of common choice. It is administered intravenously about every five days.

Local Measures.—Among those that have been advocated are the following: When infection is suspected, either from the bite of an insect or because of an abrasion on the hand of an individual handling the meat of rabbits, the probable site of entry should be thoroughly cauterized and the wound dressed.

After the lesion has developed, there seems to be no treatment of particular value. It may be dressed with compresses of potassium permanganate (1 to 7500) or mercuric chloride (1 to 5000). Local applications of mercurochrome solution, tincture of iodine, or solution of silver nitrate may be used.

The lymphadenitis may be treated by cold compresses or the ice bag. It has been recommended that the glands not be incised unless suppuration has definitely taken place and the pus has almost reached the surface. They should then be opened and otherwise treated symptomatically.

Symptomatic Treatment.—Pain of the local lesions may be relieved by the treatment previously suggested. At times the local discomfort and general pain, such as muscular soreness, headache and backache, may require such agents as codeine or codeine and acetylsalicylic acid. It would certainly seem desirable to limit the use of the latter agent in a condition characterized by such prostration as the one under discussion.

Fever. The measures of general care previously outlined will usually meet the requirements. Modified hydrotherapy may be used, if indicated.

Gastro-intestinal Symptoms. General care as previously detailed will usually meet the requirements. Small amounts of carbonated drinks are usually of benefit in nausea from this or other causes. Sodium bromide in sufficient amounts may be administered by mouth or by rectum.

Convalescence. After the febrile period has passed, the patient is generally left profoundly prostrated and showing a marked secondary anemia. The usual measures will probably apply here. These include a highly nutritious diet, hydrotherapy and massage (avoiding the areas affected by lymphadenitis). The patient should early be taken out in the sunshine and fresh air. As soon as his condition will permit, carefully regulated activity should be instituted. These patients should be kept under observation until they have returned to normal.

Complications.—Nothing in the way of complications directly traceable to this disease has yet been reported.

EPIDEMIC ENCEPHALITIS

General Statement. Definition.—Epidemic encephalitis is a mildly infectious disease characterized by inflammatory changes in the central nervous system with more or less definite resultant phenomena. Many other names have been employed, the most common of which is encephalitis lethargica.

Incidence.—No group of humanity is immune. It is most common, however, in early adult life, the majority of cases developing in the third and fourth decades. The disease is somewhat more prevalent in winter, possibly due to people living more in-doors and consequently coming into closer contact than would occur in the open. Moderate epidemics have been reported from many sections of the world, but they have never assumed the proportion of those of many other diseases.

Etiology.—The causative organism has not been definitely determined, but all indications point to the fact that it is a definite, infectious disease, resulting from the invasion of the body by a specific microörganism. The mode of transmission is also imperfectly understood, though all evidence so far points to the nasopharynx as being the portal of entry. It has been definitely established that this disease bears no relation to influenza or to poliomyelitis, with which it has often been confused. The disease is mildly contagious, but apparently only a small percentage of those exposed acquire the infection. There is seldom more than one case in a household. Freeman has fairly well established that the disease is still contagious in the chronic stage, even months or years after the onset of the acute symptoms.

Course and Prognosis.—The immediate mortality is between twenty and thirty per cent. If these cases are followed up for a period of years, it will be found that this estimate of mortality is too conservative, as rather a large number succumb after an apparent cure. Of those who do not die from the infection, about 70 per cent are impaired to a greater or less extent (Freeman). Both the immediate mortality and the percentage of impairment is greater among children.

The acute stage runs an average of between four and eight weeks, some cases recovering rapidly, others following a more protracted course and requiring months or even years before they return to approximately normal efficiency.

Freeman has ably contended that the so-called chronic stage is not so often due to the results of scarring in the early or inflammatory stage as it is due to a persistence of the infectious process, just as we find in syphilis of the central nervous system. The entire course of the disease is characterized by a tendency to remissions. Those most concerned congratulate themselves that all is progressing favorably, only to be confronted by a recurrence of unfavorable developments. The cause of death in the protracted cases is usually acute exacerbations, inter-current disease, starvation, or inanition.

Symptoms and Diagnosis.—It should be borne in mind that the symptoms result from the areas of inflammation in the central nervous system. These may be few or many, and may involve almost any location. It naturally follows, therefore, that the possible manifestations are almost innumerable.

Howell and others have divided this disease into three types, based on the symptomatology:

1. Hemiplegia, Hemianesthesia, Hemianopsia.
2. Paralysis agitans.

3. Disturbed function of cranial nerves.

It should be remembered, however, that the most common type is more or less mixed, as might be expected from the fact that in the majority of cases the inflammatory foci are multiple and are at various levels, so a mixed symptomatology necessarily results.

History. Of particular importance is investigation as to exposure to infection and also as to other factors, such as hysteria or syphilis, that might account for the symptoms presented by the individual.

Onset. While this may be fulminating in character, it is more apt to be insidious. There may be a prodromal period covering many days, during which there are such phenomena as headache, vertigo, impairment of vision, reduction in mental efficiency, asthenia, or somnolence. The active onset is characterized by an accentuation of these symptoms and by fever.

Fever. The elevation of temperature may be so slight as to be unnoticed; in fact, many claim that some of these cases are entirely afebrile. Usually the febrile period may be from a few days to a week or more. The temperature then tends to drop to subnormal and later only shows occasional rises, seldom reaching higher than 99° to 100° F.

Pulse and Respiration. These show nothing characteristic, and usually run parallel to the general condition of the patient, particularly from the standpoint of fever and prostration.

Pain. Headache is fairly constant, and may be intense in character or only a dull, persistent discomfort. Almost any type of headache may be present, such as frontal, occipital, etc. Where the cortex is involved, the intense headache of epidemic meningitis is very closely simulated. There is often general body discomfort, referred particularly to the back and lower limbs. There may be stiffness in the neck with considerable attendant discomfort.

Gastro-intestinal Symptoms. In the early stages of the disease anorexia is almost constant, and may persist well into convalescence, interfering materially with the progress of the case. There is a tendency to nausea, though persistent emesis is not a very frequent symptom.

Constipation is the rule, and is sometimes markedly resistant to treatment.

Skin Lesions. The tendency to sweating is noted in many of these cases. Some show an eruption, though it is seldom very pronounced, and it may be any one of several types, the most common of which is the scarlatiniform.

Eyes. Among the early and most persistent symptoms are diplopia and ptosis. Complete impairment of the third cranial nerve is fairly common. The ocular palsies are seldom symmetrical. There may be conjunctivitis.

Special Neurological Phenomena. Mental impairment is characteristic. There is an early tendency to impaired mental efficiency, particularly a loss of memory. Vertigo is the rule. There is a decided tendency to somnolence. A frequent finding is drowsiness during the day and insomnia at night. There may be delirium, melancholia, stupor or coma. The most common type is stupor, from which the patient may be aroused, but promptly relapses when the stimulation is removed.

Motor impairment, to a greater or lesser extent, always develops. There may be monoplegia or hemiplegia. There may be rigidity or paralysis of muscles or groups of muscles. Muscular twitchings are quite common and choreiform movements often develop, particularly late in the disease. The involvement of the facial muscles gives rise to a mask-like expression; with this is often associated a monotonous type of voice. There is a tendency to dysphagia and to retention of urine.

When the basal ganglia are involved, the resulting symptoms are of the type of paralysis agitans. These include the mask-like face, the stiff gait, and other well known manifestations, such as the tendency for the patient to turn the body, instead of turning the head on the shoulders, and to incline the body forward in walking. There is less tendency to the bread-crumb, rolling motion of the fingers. There may or may not be tremor in this type of the disease.

When the cortex is involved, the condition may simulate epidemic meningitis. There is the violent headache, nausea, projectile vomiting, stiff neck, tendency to convulsions, and other well known phenomena.

Late Symptoms or Symptoms of the Chronic Stage. Among these may be the following: Choreiform movements, that are highly resistant to treatment, but tend to improve in the course of time. Stiffness of the neck or of one or more limbs, and tremors particularly of the jaw. Slowness or difficulty in rising from a sitting position. Increased fixity of expression, staring, increased mental and physical disability, disorders of conduct, drooling of saliva, emaciation, and progressive inanition.

Symptoms in Convalescence. It will be found even in those cases progressing favorably that certain phenomena usually persist for a considerable time. Among these are the following: The patient is easily fatigued. There is a reduction of energy. An inability to think or act quickly. Persistent fixity of expression. Arthritic pains. A tendency to a recurrence of acute forms.

Laboratory. Urine. The urine is usually negative. There are certainly no findings characteristic of the disease.

Blood. In the acute stage there is a tendency to increased total white and neutrophile counts. Late in the disease anemia is usually evident.

Spinal Fluid. Examination here is principally of value in eliminating other diseases. The fluid though under slight tension is found to be normal or there may be a slight increase in the cell count, globulin, or sugar.

Diagnosis by Elimination. In some instances epidemic encephalitis can be diagnosed only by eliminating all other diseases that might account for the symptoms present. This will be discussed in the next paragraph.

Differential Diagnosis.—Only the most common diseases that might lead to confusion will be discussed in the following paragraphs.

Syphilis of the Central Nervous System. This is most apt to give a history of the primary lesion and of the so-called secondaries. The blood may show a positive Wassermann reaction. The spinal fluid will almost certainly show a positive Wassermann, increased globulin and cell count and the luetic curve in a colloidal gold test.

Tuberculous Meningitis. There is usually a history of tuberculosis of other structures, or such may be present at the time. The examination of the spinal fluid will furnish conclusive evidence in differentiating the two conditions.

Cerebral Tumor. This does not show the tendency to fever, it tends to be a much slower process in its development, and there is a greater tendency to papilledema. Examination of the spinal fluid will usually give the additional data necessary for diagnosis.

Cerebral Abscess. There is usually a history of a septic process elsewhere in the body. The condition is more apt to be acute and stormy in character. The high total and differential blood counts, and the examination of the spinal fluid should lead to correct diagnosis.

Typhoid Fever. This is not characterized by the ocular symptoms and the various evidences of involvement of the central nervous system, such as muscular twitching, paralysis, etc. Typhoid fever will often give a positive blood culture early in the course of the disease, and almost always a positive Widal later. The tendency to rose spots, low blood counts and the spinal fluid findings will always meet the requirements of diagnosis.

Disseminated Sclerosis. This is slower in development and is not characterized by febrile reaction. The impairment is confined more to the lower limbs and practically always is bilateral and symmetrical. It usually occurs in a later period of life than epidemic encephalitis.

Uremia. This need seldom be a cause of confusion. The history, and the evidences of renal damage always found lead to a prompt differentiation.

Hypothyroidea. This is seldom discussed as a factor in differential diagnosis, yet it has been known to lead to considerable confusion. Hypothyroidea does not present the classical findings of the disease under discussion, particularly the muscular twitching, paralysis, delirium, headache, and febrile reaction. A study of the laboratory findings, particularly the basal metabolism reading should leave no doubt. The therapeutic test (administration of thyroid) will promptly clear up any remaining uncertainty.

Prophylaxis.—What little can be suggested in the way of prevention will be discussed under the head of treatment.

Treatment. General Care.—As the disease is, at least, mildly contagious and is fraught with such distressing possibilities, isolation is certainly indicated. This applies particularly to the acute stage, but Freeman has brought forward an array of convincing evidence indicating that transmission is possible even in the chronic course.

In the beginning of treatment it must be realized that even under the most favorable conditions the patient is in for a long period of disability; that there may be weeks or even months during which the individual is entirely bedridden; and not only this, but that there is a marked tendency to loss of weight and to such developments as delirium, convulsions and paralysis. Every effort should, therefore, be made to secure, as far as possible, favorable facilities for the management of the case. When the patient is treated at home, the treatment quarters should be such as to admit of isolation, proper ventilation, heating, and sunshine. In addition to the bedroom, a screened porch is highly desirable, as fresh air and sunshine in pleasant weather add much to the comfort of the patient.

The bed should be comfortable and of a type that will not tend to the development of trophic lesions. The matter of clothing and covering should be dictated by the comfort of the patient.

Good nursing is highly desirable particularly as these individuals often become entirely helpless and tend to develop mental disturbances, emaciation and bedsores. There is usually constipation and often a retention of urine. These symptoms should be constantly watched for.

Diet. It is particularly desirable that a proper state of nutrition be maintained. The acute febrile period is seldom pronounced and, as a rule, there is no inability to handle sufficient food if the patient can be induced to take it. The type of diet used in typhoid fever may be employed to advantage. As soon as the febrile period has passed, milk should be given in fairly large amounts. In most instances the diet may consist of such articles as milk, buttermilk, butter, milk soup, milk-shakes, gelatin, custard, soft boiled eggs, well-cooked cereals, breakfast foods, good fruit (cooked or raw), soft vegetables, breakfast bacon and other simple foods that come within the digestive ability of the individual. Water should be given freely throughout the course of the disease.

Special Treatments.—Lumbar puncture is of value in many cases. It certainly tends to the relief of some unfavorable symptoms.

Rosenow's serum has been highly recommended by many, also the serum from convalescent patients.

Physiotherapy. This is of value particularly in convalescence. Included here is massage, active and passive motion, baking, and such other forms as may be indicated in the particular case under treatment.

Symptomatic Treatment.—There are so many possible symptoms that it is impossible to discuss the management of all of them, and there is no difference in the management here from that which would obtain should such symptoms develop from any other cause.

Constipation may indicate the use of liquid petrolatum, cascara, or enemas.

Insomnia may be relieved by the simple measures of general care, or may require the use of bromides, codeine, or barbital.

Pain may be prevented, to a certain extent, by the measures outlined for the general care of the patient. At times it may require the use of such medication as acetylsalicylic acid or codeine.

Management of Convalescence. The return to activity of these patients should be gradual and carefully supervised. Even after they are apparently well, there may be some persistent disability and the possibility of such should always be borne in mind. These patients should be kept under observation for a period of years so that the development of unfavorable symptoms may be promptly noted and proper attention given.

In convalescence such drugs as arsenic, iron, and nux vomica may be of value. It is possible that the tendency in the past has been rather to give too much than too little in the way of drugs.

Complications.—Most of those conditions that might be regarded as complications have been discussed in the preceding pages.

ACUTE ANTERIOR POLIOMYELITIS

General Statement. Definition.—This is an acute, specific, infectious, general disease, characterized by a tendency to localize in the central nervous system, especially in the gray matter of the anterior horns of the spinal cord, and to produce damage resulting in paralysis.

The tendency at one time was to apply the name acute poliomyelitis to the disease only when the gray matter of the anterior horns of the spinal cord was involved and paralysis resulted.

Both the symptomatology and treatment are divided into two stages, that of toxemia and that of paralysis. The stage of paralysis does not always develop, as in many instances the process subsides without localizing in the central nervous system.

Incidence.—The disease is both endemic and epidemic. Sporadic cases occur from time to time and more or less widespread epidemics develop. This has particularly been the case within late years; in fact, this is one of the few diseases that seem to be on the increase. It is more prevalent in the summer months, though it may occur at any season. The age of greatest incidence is before the seventh year, the second year showing the largest percentage of cases. After the seventh year the incidence gradually diminishes. It is rare in adult life; in fact, until recently adults were supposed to be immune. Within the past few years the incidence among adults has been on the increase. It has been stated by some that boys are slightly more susceptible than girls. This difference, if any, is at least negligible. It has also been claimed that certain physical types are more susceptible than others. The contention in a general way is that the well developed, robust, round faced child with a prominent chin and well developed features is most apt to acquire the infection.

Etiology.—The exciting cause is, unquestionably, a specific microörganism. Flexner, Noguchi, Rosenow, and others have done much work in the isolation of this organism. So far, there seems still to be a certain element of doubt as to this work's having been completed. The mode of transmission seems to be from person to person. Intermediate carriers are supposed to be at least rather rare, but it may be said that this phase of the subject, also, carries an element of uncertainty. The infrequency of more than one case developing in a household, the development of sporadic cases, and several other factors yet remain to be explained. It seems certain that the infecting organism is in the secretions of the nasopharynx; also that the nasopharynx is the portal of entry.

Course and Prognosis.—The incubation period is from two to fourteen days. A fair average is probably about seven days. One attack gives almost complete immunity. Many cases belong to the so-called abortive type; that is, subside without localizing in the central nervous system. It is impossible to determine the percentage of this group; some place the number as high as 50 per cent, others claim that the number following this course is negligible. Those cases that do go on to the development of paralysis present the widest variety in the structures involved and in the extent of the damage. This depends, of course, upon the localization of the involvement in the central nervous system and the extent to which the destructive process proceeds. The immediate mortality of the disease as a whole is between 10 and 20 per cent, and this varies considerably in different epidemics. There seems to be some difference, also, in the mortality between the sporadic cases and those occurring during the progress of an epidemic. In the cases terminating fatally, death results usually in from three to five days; or it might be better stated, in from one to three days after the onset of paralysis. The immediate cause of death is usually paralysis of the muscles of respiration or some intercurrent disease, particularly pneumonia. The mortality is considerably higher among adults.

The prognosis as to recovery from paralysis has not been worked out with the care that might be expected in a problem of such importance. A fairly good percentage of the cases go on to complete recovery. Many recover perfect functional use of the limbs involved, but show a slight difference in the size of these as compared with the corresponding members. In many cases there is practically no improvement. In some epidemics the outlook is much more favorable than in others; that is, there is a certain element of consistency in results during the various epidemics. A more complete discussion of the course of the paralysis will be found under symptoms and diagnosis.

Symptoms and Diagnosis.—During the course of an epidemic every case of illness, particularly in children, is regarded with suspicion and is subjected to an intensive investigation, therefore, an early diagnosis should be the rule. When an epidemic is not in progress, it is unusual for a diagnosis to be made until paralysis has developed. In fact, many cases, particularly among the poorer classes, do not call in medical assistance until the crippling results of the process have aroused their alarm. An early diagnosis is of paramount importance as it is possible that definite benefit may be derived from the early employment of some of the measures that have been suggested.

History. Of particular importance here is investigation that would disclose other causes that might account for the symptoms that the patient presents. The matter of possible exposure is one of the most important factors.

Onset. This is usually quite sudden. The initial symptoms may be divided into four groups.

1. That characterized by drowsiness, apathy, stupor, etc.
2. That characterized by irritability, excitement, a tendency to complain, etc.
3. That characterized principally by gastro-intestinal disturbances.
4. That characterized by acute respiratory symptoms.

As a rule these are more or less mixed. For example, the patient complaining of gastro-intestinal symptoms will probably also show either the nervous irritability or apathy, drowsiness and stupor. Convulsions are rare.

Symptoms in Period of General Toxemia. These usually subside within a week, and may be so slight as to pass unnoticed. In many cases the first symptom noted by the family is paralysis.

Fever. As previously suggested, the febrile reaction may be so slight as not to be noted. In fact, many cases are reported as afebrile. The usual elevation is from 100° to 103° F. This lasts only a few days, the average being from one to three.

Pain. Headache is often the first symptom noted. It usually subsides with the disappearance of the other symptoms of toxemia, but often returns at the time of the onset of paralysis. There may be distinct discomfort in the neck, back, and lower limbs. These, however, seldom reach a degree of much severity.

Neurological Phenomena. Among the manifestations that may be present are the following:

A decided tendency to restlessness, irritability, and a general state of excitement. Peabody has particularly called attention to the tendency for these patients to complain and to resent being disturbed or moved. This is probably due to the hyperesthesia which results in pain when the patient is handled.

There is a marked tendency to somnolence, drowsiness, delirium, and even coma. The mind is usually clear, even in the presence of rather advanced depression, the patient being able to answer intelligently when aroused, but dropping back into the former state when not disturbed.

There is no retraction of the neck, but usually some stiffness that is particularly evidenced as resistance to anterior flexion. The reflexes are usually abnormal. In the early stages of the disease they may be exaggerated or reduced. Later, of course, the deep reflexes are lost in the limbs involved.

Gastro-intestinal Symptoms. Among these may be anorexia, nausea, and vomiting. Nausea may be one of the first symptoms noted. Vomiting occurs in about one-third of the cases. Diarrhea or constipation may be present. There is little harmony in the statistics that have been published as to the frequency and character of the intestinal symptoms.

Special Symptoms. Particular attention has been called to the physical appearance of these patients, the principal characteristic being an expression of apprehension and resentment.

The superficial lymph nodes are usually enlarged. The tonsils may be red, though there is no constancy in the frequency of this symptom. There is a decided tendency to sweating.

Special Forms. Depending upon the localization of the infection in the brain, two special types have been noted: the meningeal, which closely simulates meningitis; and the encephalitic, which closely simulates epidemic encephalitis. This resemblance is so marked that many excellent physicians in the past have claimed that epidemic encephalitis was but a form of acute anterior poliomyelitis.

Paralysis. As previously stated, this may not occur, many cases clearing up without localization that results in this sequela.

Any one or more of various groups of muscles may be involved, depending upon the locality of the destructive process. The most frequently quoted statistics in this regard is the table of Wickman, which is based on an analysis of 868 cases and is given below:

One or both legs	353
One or both arms	75
Combination of legs and arms	152
Combination of legs and trunk muscles	85
Combination of arms and trunk muscles	10
Trunk muscles alone	9
Paralysis of "the whole body"	23
Ascending paralysis	32
Descending paralysis	13
Combination of spinal and cranial nerves	34
Cranial nerves alone	22
Localization of paralysis not given	60

It will be noted that the paralysis usually is in the legs and arms. When the spinal nerves are affected there may be paralysis of the muscles supplied by them, which produces such results as facial paralysis, ptosis, dysphagia, and dyspnoea. The last is the most serious, as it is caused by the involvement of the muscles of respiration, and is the most common cause of death. The extensor groups of muscles are most frequently affected. The rectal and vesicle sphincters are seldom involved and, if affected, the disturbance is transient.

The degree of damage varies from a slight and transient impairment to complete and permanent loss of function.

Paralysis begins during or soon after the stage of acute toxemia. In other words, about the second to fourth day after the onset of the disease. It may be first noted as weakness and twitching of the muscle group affected. In many cases no impairment is noted until full paralysis has developed. The paralysis is usually maximal in a few days, usually within the first twenty-four hours after the beginning of its development, though in some cases there is a slight increase for several days. It begins to subside in from two to four weeks, and may continue to regress for a year or more. It may be stated that as a rule further improvement is not to be expected after the first year.

Tenderness in the affected structures may persist for several weeks. Cutaneous sensibility is not impaired.

The return of tendon reflexes, particularly of the knee, may be the first symptom of improvement noted.

A certain amount of muscular atrophy is the rule. There may be contractures resulting in considerable deformity. For example, if an extensor group of muscles is paralyzed, the flexors will pull the structures involved into a faulty position. In many cases, particularly in young subjects, considerable shortening of the limb may be one of the end results of the primary destructive process, as a result of imperfect bone development.

Laboratory. Urine. The urinalysis gives no information of value.

Blood. Early in the disease the blood shows an increase in the total white count; this usually reaches from 10,000 to 18,000. There is an increase in the neutrophiles.

Spinal Fluid. This is usually clear and under slightly increased tension. There is an increase in the cell count that seems to have some prognostic significance, as those cases showing a high cell count usually run a more severe course. There may be some increase in globulin. The sugar content tends to remain normal.

Differential Diagnosis.—Early in the course of this disease there may be some confusion in eliminating certain other conditions, the most common of which are epidemic meningitis, tuberculous meningitis, and epidemic encephalitis.

Epidemic Meningitis. This is a more stormy process. There is more pain, usually projectile vomiting, and fairly early a tendency to opisthotonus. The special signs, as Kernig's, are fairly characteristic. Examination of the spinal fluid will give positive information.

Tuberculous Meningitis. This is slower in its development. There is not the early subsidence of the toxic stage and the development of the characteristic paralysis. There is usually a history of exposure or tuberculous involvement elsewhere in the body. There is not the tendency to increased total white and neutrophile counts. The examination of the spinal fluid will usually establish the differentiation.

Epidemic Encephalitis. This may be impossible to differentiate in the early stage of the process except by the history of exposure, particularly from the standpoint of an epidemic's being present. The progress of the disease, however, is entirely different. The toxic stage of acute poliomyelitis clears up in a few days, being followed, in most cases, by the characteristic paralysis. In epidemic encephalitis the symptoms progressively deepen. The results of the examination of the blood and spinal fluid enable an early diagnosis to be made with assurance.

Prophylaxis.—This will be discussed in more detail under the head of treatment.

In most places it is required that this disease be reported promptly. It is certainly infectious, and while the mode of transmission has not been definitely established, the disease is so disastrous in its immediate and late results that every precaution should be taken to prevent infecting others.

Treatment.—No specific has been found, and effort is principally directed toward preventing the spread of the infection, contributing to the comfort of the patient and repairing the damage that has been done. This is especially the case where so large a percentage are not diagnosed until after paralysis has developed, when it is too late to hope to limit the extent of the damage.

General Care.—In beginning treatment it must be remembered that the patient is in for a long period of disability; that during a considerable part of this time any movement will be attended with discomfort; and that maintaining a proper state of nutrition and general health are factors of first importance.

Treatment quarters should be selected with the facts just stated in mind. When the patient is treated at home, it is imperative that the room be one that will render possible the isolation of the patient, thus protecting the rest of the household. Under no circumstances should it be used as a family sitting-room or a passage-way. It is rare for a second patient to develop in a household, but such has occurred with sufficient frequency to render negligence of this precaution inexcusable. The room should also be one that can be well ventilated in summer and properly heated in cold weather. Sunshine is highly desirable and a screened porch adjoining the bedroom is of the greatest possible advantage.

The bed should be of such type as will admit of the greatest amount of comfort. Trophic lesions are rather rare, but are always a possibility in any case of protracted illness, and more especially where the tendency is for the patient to remain with limited movement for a considerable period of time.

Rest. This should be absolute, and all disturbing factors, such as noise or excitement, excluded.

Diet. In diet the same rule will apply as in other illnesses of long duration. During fever and general discomfort the patient should be given only simple liquids, such as carbonated drinks, fruit juices, strained soups and broths, malted milk or similar preparations, and tea or coffee, if accustomed to them.

As soon as the toxic stage has passed, the diet may be increased, depending upon the age of the patient and the known digestive ability. The menu should be gradually increased to include fruits, cereals, soft vegetables, and in most instances the patient may be put upon a full diet in a comparatively short time.

Symptomatic Treatment.—The treatment of paralysis will be discussed in a separate paragraph.

During the stage of toxemia discomforts arise that may require special attention, though such is not usually the case.

Pain may be relieved by codeine or acetylsalicylic acid or both.

Nausea may be controlled by careful attention to diet and elimination, and the employment of such measures as an ice-bag to the head and the administration of small amounts of carbonated drinks. Bromides may be used if necessary.

Diarrhea or constipation should be treated as the same condition occurring from other causes.

Special Measures.—Lumbar puncture is employed not only for diagnostic purposes, but at times to promote comfort, and many have claimed for it some curative value.

Serum from convalescent patients has been used intraspinally and intravenously with excellent results if employed early. After the development of paralysis, it is entirely without value.

Rosenow's serum has been used in a large series of cases apparently with excellent results. This, also, to be of value must be used early. It is administered intraspinally and intravenously.

Treatment of Paralysis.—Many local measures have been suggested and any that are used should be begun as soon as the hyperesthesia in the structures involved has subsided. It is well to begin with light massage and careful passive motion. These should be gradually increased as the tolerance of the patient is established or developed. As soon as there is any return of function, active motion should be commenced in a small way and gradually increased. Hot applications or alternating hot and cold applications, and baking are extensively employed. Baking particularly has been almost universally used.

Diathermy. This has been highly recommended, as well as various other electrical treatments.

Sooner or later devices for the mechanical support of the limb involved may be indicated. This is particularly the case where the paralysis is in the legs. These devices not only enable the patient to get up and out, but tend to limit deformity.

Surgery. This has a field of usefulness in selected cases. Such work is done as tenotomy and transplantation.

Unless there is complete return to normal, physiotherapy should be employed for at least a period of one year. In some cases considerably longer effort has apparently met with success.

Complications.—Those conditions that might be regarded as complications have been discussed in the preceding paragraphs.

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